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| Das Revisionsverzeichnis des Katalogs wird auf Seite 288 wiedergegeben. Auf unserer Website <a href="http://www.bonfiglioli.com">www.bonfiglioli.com</a> werden die Kataloge in ihrer letzten, überarbeiteten Version angeboten. |                                             |                                         |                                                      |                                                                   |                                 |
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## 1.0 INTRODUZIONE

In questo catalogo la TRASMITAL BONFIGLIOLI presenta la sua gamma di riduttori epicicloidali modulari serie 300.

Questa serie è stata ampliata ed arricchita di nuove grandezze disponibili, miglioramenti tecnici apportati e dall'estensione della modularità totale fino alle grandezze superiori. Tale caratteristica costruttiva si traduce in una migliore flessibilità produttiva interna, nella possibilità di avere in tempi brevi prodotti nelle grandezze ed esecuzioni richieste, sia direttamente dall'azienda che dalle filiali appartenenti alla organizzazione di vendita BONFIGLIOLI localizzate in numerosi paesi del mondo.

I riduttori sono verificati secondo i seguenti standard:

ISO DP 6336 per gli ingranaggi  
ISO 281 per i cuscinetti

## 1.0 INTRODUCTION

This catalogue presents TRASMITAL BONFIGLIOLI's range of Series 300 modular planetary gearboxes.

The range has been expanded and integrated with new sizes, technical improvements and enhanced modularity right through to the larger sizes. This feature signifies greater flexibility in internal production to ensure quick availability of products in the sizes and types requested either directly from the company or from the many affiliates belonging to the BONFIGLIOLI sales network in various countries around the world.

The gearboxes are tested in conformity with the following standards:

ISO DP 6336 for gears  
ISO 281 for bearings

## 1.0 EINFÜHRUNG

In diesem Katalog stellt die TRASMITAL BONFIGLIOLI seine Angebotsreihe an modularen Planetengetrieben der Serie 300 vor.

Diese Serie wurde weiter ausgebaut und durch neue, nun zur Verfügung stehende Baugrößen bereichert. Darüber hinaus wurden hier technische Verbesserungen angetragen und die Gesamtmodularität bis zu den oberen Baugrößen hin erweitert. Diese Konstruktionsmerkmale lassen sich in eine bessere Flexibilität der internen Produktivität, in die Möglichkeit schnell Produkte in den gewünschten Größen und Ausführungen, sowohl direkt von der Firma selbst, als auch über eine der zahlreichen, zur Organisation der BONFIGLIOLI gehörenden Filialen, die in ebenso zahlreichen und weltweit verbreiteten Ländern erhalten zu können, übersetzen.

Die Getriebe werden den folgenden Normen gemäß geprüft:

ISO DP 6336 für Zahnräder  
ISO 281 für Lager

## 1.0 INTRODUCTION

Avec ce catalogue TRASMITAL BONFIGLIOLI présente sa gamme de réducteurs épicycloïdaux modulaires série 300.

Elle a été développée et enrichie quant à la disponibilité de nouvelles tailles, l'apport d'améliorations techniques aussi bien qu'à l'extension de la modularité globale jusqu'aux tailles supérieures. Cette caractéristique de construction se traduit dans une flexibilité productive interne plus importante, dans la possibilité d'obtenir, sous de courts délais, les produits ayant les tailles et les exécutions nécessaires, tant de manière directe de l'entreprise, qu'à travers les nombreuses filiales appartenant à l'organisation de vente BONFIGLIOLI, établies dans plusieurs pays du monde.

Les réducteurs sont vérifiés selon les normes suivantes:

ISO DP 6336 pour les engrenages  
ISO 281 pour les roulements



## 2.0 CARATTERISTICHE

La serie 300 è una gamma di riduttori epicicloidali multipiezo azionabili da motori idraulici ed elettrici.

Le caratteristiche di base sono:

- 16 grandezze
- coppie in uscita fino a 540.000 Nm
- potenze trasmissibili fino a 450 kW
- rapporti da 1:3,5 a 3000
- costruzione modulare
- esecuzione:
  - in linea
  - angolare (con primo stadio realizzato con coppia conica Gleason)
- da 1 a 4 stadi di riduzione
- versioni in uscita per montaggio con flangia, con piede, pendolare.
- alberi in uscita: con linguetta, scanalati, femmina scanalati, cavi cilindrici per montaggio pendolare con giunto ad attrito.
- predisposizioni motore in entrata per:
  - motori elettrici, secondo IEC forma B5
  - motori idraulici dei principali costruttori e secondo SAE J744C
- alberi veloci in entrata
- motoriduttori con:
  - motori elettrici IEC
  - motori idraulici orbitali TRASMITAL MG
- freni idraulici negativi di stazionamento per utilizzo con motori idraulici
- accessori per alberi uscita:
  - flange
  - pignoni
  - barre scanalate
  - giunti ad attrito

Altre caratteristiche costruttive sono:

- elevato rapporto coppia trasmissibile/dimensioni d'ingombro
- elevata capacità a sopportare carichi radiali e assiali sugli alberi di uscita grazie all'utilizzo, sulle versioni H, di cuscinetti a rulli conici
- elevati rendimenti
- collegamenti fra gli organi interni tramite profili scanalati, non utilizzo di linguette
- stadi di riduzione con portaplanetari flottanti per ottenere la massima ripartizione dei carichi fra gli ingranaggi planetari
- carcasse in ghisa sferoidale.

## 2.0 SPECIFICATIONS

The 300 series consist of a range of multi-purpose planetary gear-boxes that can be operated by either hydraulic or electric motors. Basic features are:

- 16 sizes
- output torque up to 540,000 Nm
- transmissible power up to 450 kW
- ratios from 3.5:1 to 3000:1
- modular design
- versions:
  - in-line
  - right angle (first stage with bevel gear pair Gleason)
- reduction stages ranging from 1 to 4
- with flange-mounted, foot-mounted and shaft-mounted output
- output shafts with keyway, splined, splined hollow shafts, hollow shafts for shaft-mounting with shrink disc
- input adaptors for:
  - electric motors to IEC standards design B5
  - hydraulic motors by major manufacturers and according to SAE J744C
- high speed shafts
- gearmotors with:
  - electric motors IEC
  - hydraulic orbital motors by TRASMITAL MG
- negative hydraulic parking brakes for operation by hydraulic motors
- output shaft accessories:
  - flanges
  - pinions
  - splined bars
  - shrink discs

More design features:

- high ratio of transmissible torque to overall dimensions
- high radial and axial load capacity of output shafts thanks to tapered roller bearings fitted on the H versions
- high efficiency
- inner parts are connected using grooved sections instead of tabs
- planetary gears of reduction stages mounted to floating holders to ensure maximum load distribution among planetary gears
- housing made of spheroidal cast iron.

## 2.0 KONSTRUKTIONS-MERKMALE

Die Serie 300 ist eine Reihe an vielseitig einsetzbaren Planetengetrieben, die von Hydraulik- oder Elektromotoren angetrieben werden können. Ihre Grundmerkmale sind:

- 16 Baugrößen
- Abtriebsdrehmomente bis zu 540.000 Nm
- Antriebsleistungen bis zu 450 kW
- Übersetzungsverhältnisse von 1:3,5 bis 3000
- Modularbauweise
- Ausführung:
  - linear
  - auf Winkel (erste Stufe mit Kegelradpaarung realisiert)
- von 1 bis 4 Untersetzungsstufen
- Abtriebsversionen für Montage mit Flansch, mit Fuß, in Aufsteckversion)
- Abtriebswellen: mit Passfeder, Vielkeil, Vielkeilhohlwelle, zylindrischer Hohlwelle für Schrumpfscheibenmontage.
- Vorbereitet für Antriebsmotor: Elektromotoren, gemäß IEC Form B5
- Hydraulikmotoren der bedeutendsten Hersteller und gemäß SAE J744C
- Schnelle Wellen am Antrieb
- Getriebemotoren mit:
  - Elektromotoren IEC
  - orbitale Hydraulikmotoren der TRASMITAL MG
- hydraulische Abstellbremsen für Steuerung durch Hydraulikmotoren
- Zubehör für Abtriebswellen:
  - Flanschen
  - Ritzel
  - Keilstäbe
  - Schrumpfscheiben

Andere Konstruktionsmerkmale lassen sich folgendermaßen zusammenfassen:

- hohes übertragbares Drehmoment/Verhältnis zu den Ausmaßen
- Hohe Aufnahmekapazität von Radial- und Axiallasten an den Abtriebswellen dank eines Einsatzes, bei den Versionen H, von Kegelrollenlagern
- hohe Wirkungsgrade
- Verbindungen zwischen den inneren Organen mittels Nutprofilen, es werden keine Passfedern verwendet
- Untersetzungsstufen mit schwimmenden Planetenradträger zur Belastungsverteilung auf die Planetenrädern
- Gehäuse aus Sphäroguss.

## 2.0 CARACTERISTIQUES

La série 300 est une gamme de réducteurs épicycloïdaux polyvalents, qui peuvent être actionnés par des moteurs hydrauliques et électriques. Les principales caractéristiques sont:

- 16 tailles
- couples en sortie jusqu'à 540.000 Nm
- puissances transmissibles jusqu'à 450 kW
- rapports de 1:3,5 à 3000
- construction modulaire
- exécution:
  - linéaire
  - angulaire (premier étage réalisé avec couple conique)
- de 1 à 4 étages de réduction
- versions en sortie pour assemblage avec bride, patte, ou pendulaire
- arbres de sortie: avec clavette; cannelés; femelle cannelés; creux cylindriques pour assemblage pendulaire avec frette de serrage
- raccords à l'entrée pour les moteurs suivants:
  - moteurs électriques, selon CEI forme B5
  - moteurs hydrauliques des marques principales et conformes à SAE J744C
- arbres rapides d'entrée
- motoréducteurs avec :
  - moteurs électriques CEI
  - moteurs hydrauliques orbitaux TRASMITAL MG
- freins hydrauliques négatifs de stationnement pour commande avec moteurs hydrauliques
- accessoires pour arbre de sortie:
  - brides
  - pignons
  - barres cannelées
  - joints d'accouplement à friction

D'autres caractéristiques de construction sont :

- rapport de couple transmissible élevé / dimensions d'encombrement
- capacité élevée à supporter les charges radiales et axiales sur les arbres de sortie, grâce à l'utilisation, sur les versions H., de roulements à rouleaux coniques
- rendements élevés
- raccords entre les organes intérieurs par le biais de profils cannelés, et non pas de clavettes
- étages de réduction avec porte-planétaires flottants pour obtenir la maxime répartition des charges dans le train d'engrenages épicycloïdaux
- carter en fonte G.S.

3.0 **FORME  
COSTRUTTIVE**

3.0 **VERSIONS**

3.0 **BAUFORMEN**

3.0 **FORMES DE  
CONSTRUCTION**

**A** ENTRATE / INPUT  
EINGANGE / ENTREES

**B** RIDUZIONI / REDUCTIONS  
UNTERSETZUNGEN / TRAINS EPICICLOÏDAUX

- A**
- 1 Motore idraulico orbitale MG, con e senza freno
  - 2 Motore idraulico
  - 3 Predisposizione motore idraulico
  - 4 Coperchio
  - 5 Freno negativo
  - 6 Albero veloce
  - 7 Motore elettrico
  - 8 Predisposizione motore elettrico

- B**
- 9 Stadio riduzione angolare
  - 10 Uno stadio di riduzione
  - 11 Due stadi di riduzione
  - 12 Tre stadi di riduzione

- C**
- 13 Uscita albero maschio cilindrico o scanalato
  - 14 Uscita rinforzata albero maschio cilindrico o scanalato
  - 15 Uscita con piede di supporto ed albero maschio cilindrico o scanalato
  - 16 Uscita albero femmina scanalato
  - 17 Uscita albero femmina per giunto ad attrito
  - 18 Uscita albero maschio cilindrico
  - 19 Uscita albero maschio scanalato
  - 20 Uscita albero femmina scanalato
  - 21 Uscita albero femmina per giunto ad attrito
  - 22 Piede di supporto

- D**
- 23 Flangia
  - 24 Pignone
  - 25 Manicotto liscio
  - 26 Fondello d'arresto
  - 27 Barra scanalata
  - 28 Giunto ad attrito

- A**
- 1 Orbital hydraulic motor MG with/without brake
  - 2 Hydraulic motor
  - 3 Hydraulic motor setting
  - 4 Cover
  - 5 Negative brake
  - 6 Input shaft
  - 7 Electric motor
  - 8 Electric motor setting

- B**
- 9 Right angle reduction stage
  - 10 Single reduction stage
  - 11 Two reduction stages
  - 12 Three reduction stages

- C**
- 13 Keyed or splined solid shaft output
  - 14 Keyed or splined heavy solid shaft output
  - 15 Output with support bracket and keyed or splined solid shaft
  - 16 Splined hollow shaft output
  - 17 Hollow shaft output for shrink disc
  - 18 Keyed solid shaft output
  - 19 Splined solid shaft output
  - 20 Splined hollow shaft output
  - 21 Hollow shaft output for shrink disc
  - 22 Support bracket

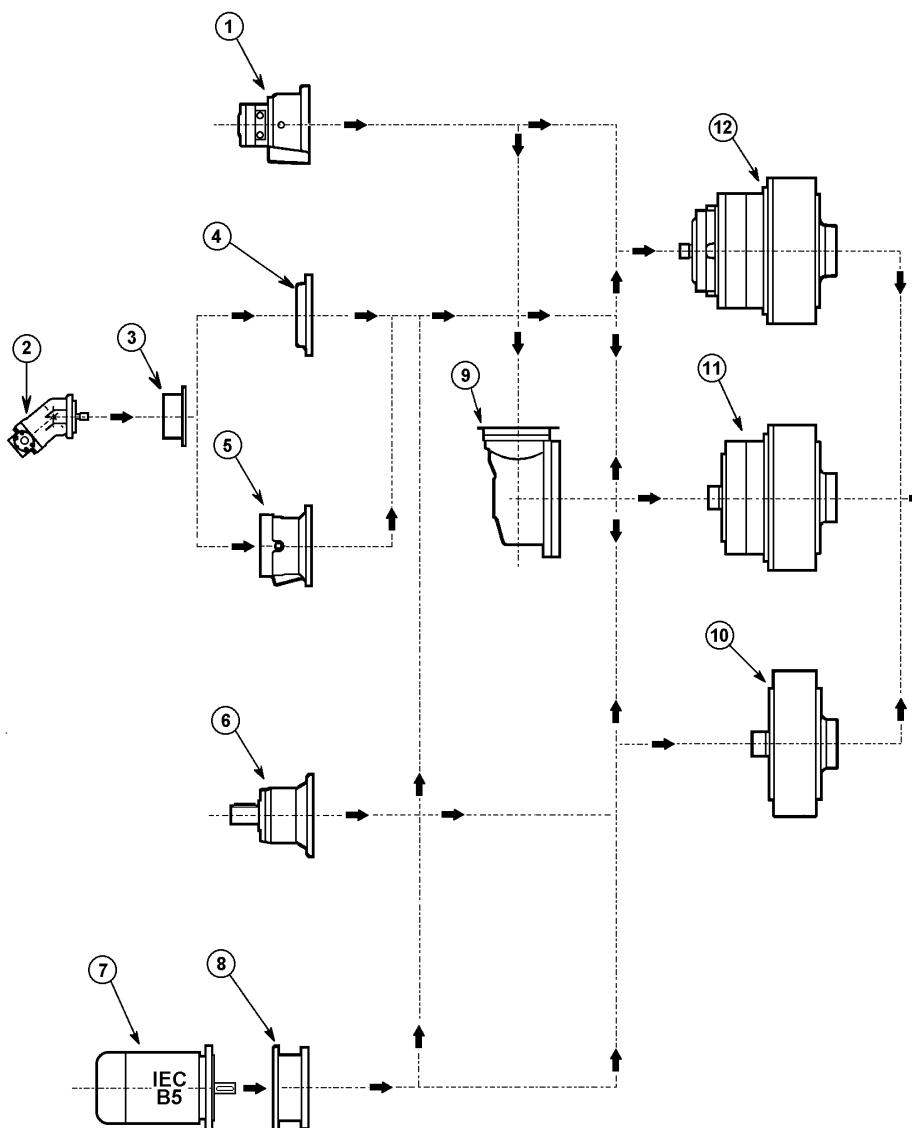
- D**
- 23 Flange
  - 24 Pinion
  - 25 Sleeve coupling
  - 26 Stop bottom plate
  - 27 Splined bar
  - 28 Shrink disc

- A**
- 1 Orbitaler Motor MG mit und ohne Bremse
  - 2 Hydraulikmotor
  - 3 Anbauvorbereitung für Hydraulikmotor
  - 4 Deckel
  - 5 Negative Bremse
  - 6 Antriebswelle
  - 7 Elektromotor
  - 8 Anbauvorbereitung für Elektromotor

- B**
- 9 Winkeluntersetzungsstufe
  - 10 Eine Untersetzungsstufe
  - 11 Zwei Untersetzungsstufen
  - 12 Drei Untersetzungsstufen

- C**
- 13 Abtrieb an Einsteckwelle oder Keilwelle
  - 14 Abtrieb an Einsteckwelle oder Verstärkter Abtrieb
  - 15 Abtrieb mit Stützfuß und Einsteckwelle oder Keilwelle
  - 16 Abtrieb an Aufsteckkeilwelle
  - 17 Abtrieb an Aufsteckwelle für Reibkupplung
  - 18 Abtrieb an Einsteckwelle
  - 19 Abtrieb an Keileinsteckwelle
  - 20 Abtrieb an Keilaufsteckwelle
  - 21 Abtrieb an Aufsteckwelle für Reibkupplung
  - 22 Stützfuß

- D**
- 23 Flansch
  - 24 Ritzel
  - 25 Nabe
  - 26 Bodenhaltescheibe
  - 27 Vielkeilvollwelle
  - 28 Schrumpfscheibe



3.0 **FORME  
COSTRUTTIVE**

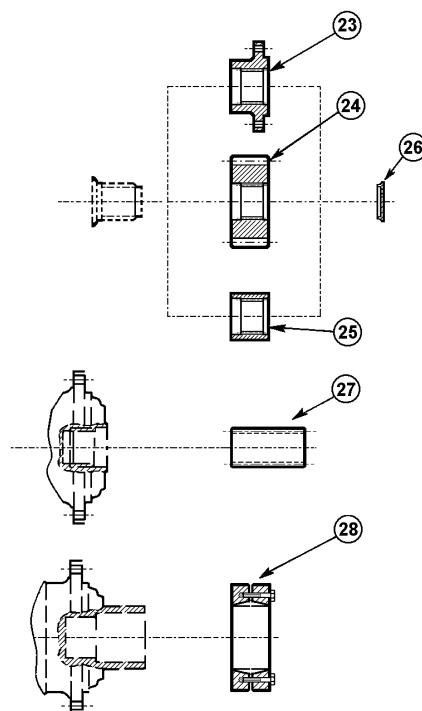
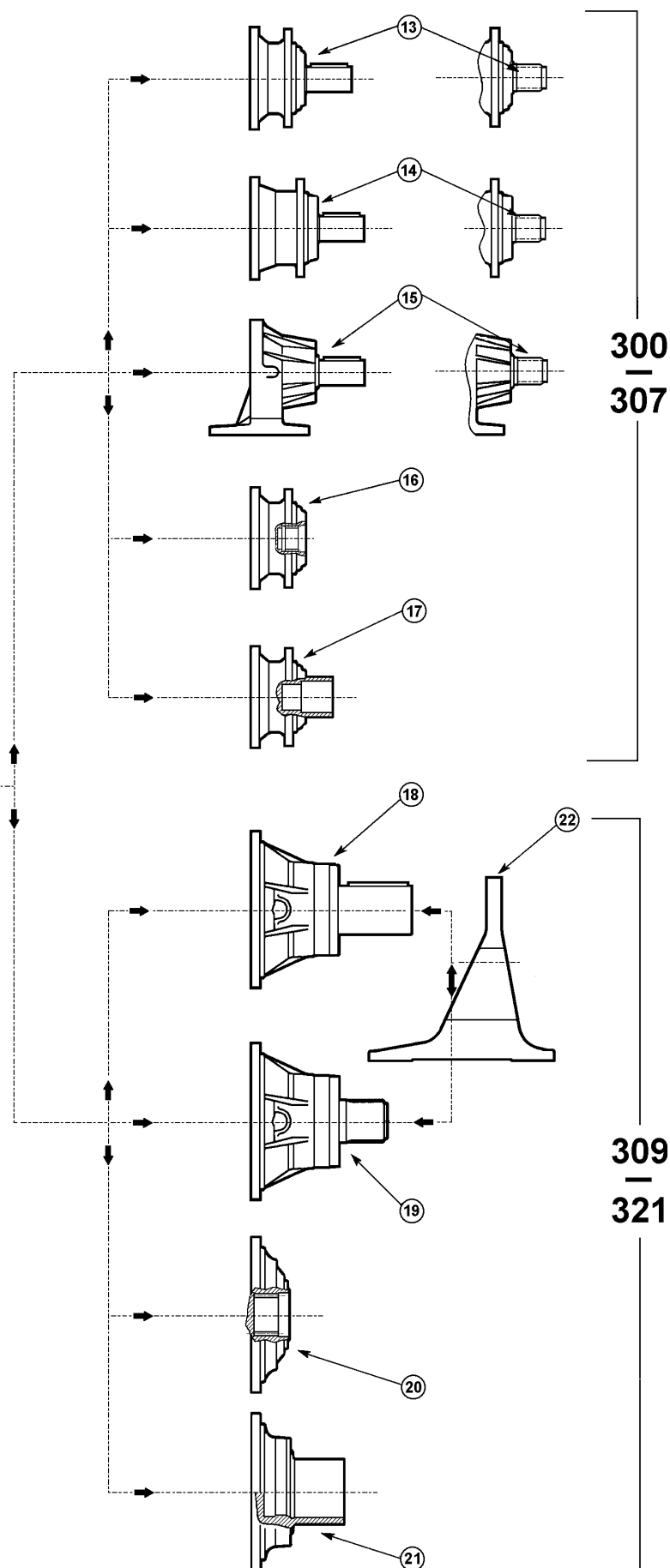
3.0 **VERSIONS**

3.0 **BAUFORMEN**

3.0 **FORMES DE  
CONSTRUCTION**

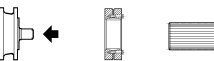
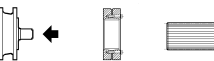
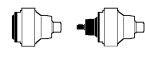
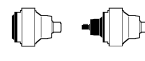
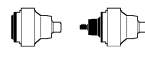
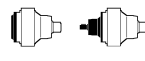
**C** USCITE / OUTPUT  
ABTRIEB / SORTIES

**D** ACCESSORI / FITTINGS  
ZUBEHÖR / ACCESSOIRES



- A** 1 Motore idraulico orbitale MG, con o senza freno  
2 Motore idraulico  
3 Preparazione motore idraulico  
4 Coperchio  
5 Freno negativo  
6 Albero veloce  
7 Motore elettrico  
8 Preparazione motore elettrico
- B** 9 Stadio di riduzione angolare  
10 Un stadio di riduzione epicicloidale  
11 Due stadi di riduzione epicicloidale  
12 Tre stadi di riduzione epicicloidale
- C** 13 Uscita albero maschio cilindrico o filettato  
14 Uscite rinforzate albero maschio cilindrico o filettato  
15 Uscita con piedistallo di supporto e albero maschio cilindrico o filettato  
16 Uscita albero femmina filettato  
17 Uscita albero femmina per freno  
18 Uscita albero maschio cilindrico  
19 Uscita albero maschio filettato  
20 Uscita albero femmina filettato  
21 Uscita albero femmina per freno  
22 Piedistallo di supporto
- D** 23 Brida  
24 Pignone  
25 Manico liscio a filettatura interna  
26 Rondella di arresto  
27 Barra filettata  
28 Freno di serraggio

| 4.0                               | SIMBOLOGIA E UNITA' DI MISURA |                                                                                                              | 4.0                                                                                                 | SYMBOLS AND UNITS OF MEASURE |                                                                                                                    | 4.0                                                                                                                    | VERWENDETE SYMBOLE INHEITEN |  | 2.0 | SYMBOLES ET UNITES DE MESURE |  |
|-----------------------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-----------------------------|--|-----|------------------------------|--|
| Simb. Symb.                       | U.m. Meßeinh.                 | Descrizione                                                                                                  | Description                                                                                         | Description                  | Beschreibung                                                                                                       | Description                                                                                                            |                             |  |     |                              |  |
| A <sub>c1</sub>                   | [N]                           | Carico assiale di calcolo in entrata riduttore                                                               | Calculated thrust load at gearbox input shaft                                                       |                              | Axialkräfte auf Getriebe Antriebswelle Berechnungsgrundlage                                                        | Charge axiale de calcul à l'entrée du réducteur                                                                        |                             |  |     |                              |  |
| A <sub>c2</sub>                   | [N]                           | Carico assiale di calcolo in uscita riduttore                                                                | Calculated thrust load at gearbox output shaft                                                      |                              | Axialkräfte auf Getriebe Abtriebswelle Berechnungsgrundlage                                                        | Charge axiale de calcul à la sortie du réducteur                                                                       |                             |  |     |                              |  |
| A <sub>n1</sub>                   | [N]                           | Carico assiale nominale in entrata riduttore                                                                 | Rated thrust load at gearbox input shaft                                                            |                              | Nenn-Axialkräfte auf Getriebe Antriebswelle                                                                        | Charge axiale nominale à l'entrée du réducteur                                                                         |                             |  |     |                              |  |
| A <sub>n2</sub>                   | [N]                           | Carico assiale nominale in uscita riduttore                                                                  | Rated thrust load at gearbox output shaft                                                           |                              | Nenn-Axialkräfte auf Getriebe Abtriebswelle                                                                        | Charge axiale nominale à la sortie du réducteur                                                                        |                             |  |     |                              |  |
| F <sub>h</sub>                    |                               | Fattore di durata per calcolo riduttori                                                                      | Lifetime factor for gearbox calculation                                                             |                              | Lebensdauerfaktor für die Getriebeberechnung                                                                       | Facteur de durée pour le calcul des reducteurs                                                                         |                             |  |     |                              |  |
| F <sub>h1</sub> , F <sub>h2</sub> |                               | Fattore di durata per calcolo cuscinetti alberi entrata, uscita                                              | Lifetime factor for bearing shafts calculation                                                      |                              | Lebensdauerfaktor für die Berechnung der Ein- und ausgangswellenlager                                              | Facteur de durée pour le calcul des roulements sur les arbres d'entrée et sortie                                       |                             |  |     |                              |  |
| f <sub>h1</sub> , f <sub>h2</sub> |                               | Fattore correttivo per carichi sugli alberi                                                                  | Load corrective factor on shafts                                                                    |                              | Korrektur faktor für wellenbelastungen                                                                             | Facteur de correction pour charges sur les arbres                                                                      |                             |  |     |                              |  |
| f <sub>m</sub>                    |                               | Fattore di maggiorazione                                                                                     | Increase factor                                                                                     |                              | Überdimensionierungsfaktor                                                                                         | Facteur de majoration                                                                                                  |                             |  |     |                              |  |
| f <sub>s</sub>                    |                               | Fattore di servizio                                                                                          | Service factor                                                                                      |                              | Betriebsfaktor                                                                                                     | Facteur de service                                                                                                     |                             |  |     |                              |  |
| f <sub>t</sub>                    |                               | Fattore termico                                                                                              | Thermal factor                                                                                      |                              | Wärmefaktor                                                                                                        | Facteur thermique                                                                                                      |                             |  |     |                              |  |
| f <sub>tp</sub>                   |                               | Fattore di temperatura                                                                                       | Temperature factor                                                                                  |                              | Temperaturfaktor                                                                                                   | Facteur de température                                                                                                 |                             |  |     |                              |  |
| f <sub>v</sub>                    |                               | Fattore di velocità                                                                                          | Speed factor                                                                                        |                              | Drehzahlfaktor                                                                                                     | Facteur de vitesse                                                                                                     |                             |  |     |                              |  |
| h                                 | [h]                           | Durata in ore                                                                                                | Lifetime in hours                                                                                   |                              | Dauer in Stunden                                                                                                   | Durée en heures                                                                                                        |                             |  |     |                              |  |
| i                                 |                               | Rapporto di riduzione                                                                                        | Reduction ratio                                                                                     |                              | Übersetzung                                                                                                        | Rapport de réduction                                                                                                   |                             |  |     |                              |  |
| K <sub>r</sub>                    |                               | Fattore di sollecitazione del carico radiale                                                                 | Radial load factor                                                                                  |                              | Belastungsfaktor der Radiallast                                                                                    | Facteur de sollicitation de la charge radiale                                                                          |                             |  |     |                              |  |
| I                                 |                               | Rapporto di intermittenza                                                                                    | Intermittence factor                                                                                |                              | Relative Einschaltdauer                                                                                            | Rapport d'intermittence                                                                                                |                             |  |     |                              |  |
| M <sub>2</sub>                    | [Nm]                          | Coppia di riferimento                                                                                        | Reference torque                                                                                    |                              | Bezugsdrehmoment                                                                                                   | Couple de référence                                                                                                    |                             |  |     |                              |  |
| M <sub>b</sub>                    | [Nm]                          | Coppia nominale del freno                                                                                    | Rated brake torque                                                                                  |                              | Nenn-Drehmoment der Bremse                                                                                         | Couple nominal du frein                                                                                                |                             |  |     |                              |  |
| M <sub>c2</sub>                   | [Nm]                          | Coppia di calcolo in uscita riduttore                                                                        | Calculated torque at gearbox output                                                                 |                              | Soll-Drehmoment Abtriebswelle Getriebe                                                                             | Couple de calcul de sortie réducteur                                                                                   |                             |  |     |                              |  |
| M <sub>n2</sub>                   | [Nm]                          | Coppia nominale in uscita riduttore                                                                          | Gearbox rated output torque                                                                         |                              | Nenn-Drehmoment Abtriebswelle Getriebe                                                                             | Couple nominal de sortie réducteur                                                                                     |                             |  |     |                              |  |
| M <sub>2max</sub>                 | [Nm]                          | Coppia massima in uscita riduttore                                                                           | Gearbox max. output torque                                                                          |                              | Max-Drehmoment Abtriebswelle Getriebe                                                                              | Couple max. de sortie réducteur                                                                                        |                             |  |     |                              |  |
| M <sub>r1</sub>                   | [Nm]                          | Coppia richiesta in entrata al riduttore                                                                     | Required torque at gearbox input                                                                    |                              | Erforderliches Drehmoment am Getriebeantrieb                                                                       | Couple nécessaire à l'entrée du réducteur                                                                              |                             |  |     |                              |  |
| M <sub>r2</sub>                   | [Nm]                          | Coppia richiesta in uscita al riduttore                                                                      | Required torque at gearbox output                                                                   |                              | Verlangtes Drehmoment Getriebeabtriebswelle                                                                        | Couple requis à la sortie du réducteur                                                                                 |                             |  |     |                              |  |
| n <sub>1</sub>                    | [min <sup>-1</sup> ]          | Velocità angolare in entrata riduttore                                                                       | Angular speed at gearbox input                                                                      |                              | Drehzahl Antriebswelle Getriebe                                                                                    | Vitesse angulaire à l'entrée du réducteur                                                                              |                             |  |     |                              |  |
| n <sub>2</sub>                    | [min <sup>-1</sup> ]          | Velocità angolare in uscita riduttore                                                                        | Angular speed at gearbox output                                                                     |                              | Drehzahl Abtriebswelle Getriebe                                                                                    | Vitesse angulaire à la sortie du réducteur                                                                             |                             |  |     |                              |  |
| p                                 | [bar]                         | Pressione olio idraulico                                                                                     | Hydraulic oil pressure                                                                              |                              | Druck des Hydrauliköls                                                                                             | Pression huile hydraulique                                                                                             |                             |  |     |                              |  |
| P <sub>1</sub>                    | [kW]                          | Potenza max. trasmissibile in entrata riduttore                                                              | Max transmissible power at gearbox input                                                            |                              | Max übertragene Leistung Antriebswelle Getriebe                                                                    | Puissance maximum transmissible à l'entrée du réducteur                                                                |                             |  |     |                              |  |
| P <sub>1'</sub>                   | [kW]                          | Potenza max. trasmessa in entrata riduttore                                                                  | Transmitted power at gearbox input                                                                  |                              | Max übertragene Leistung Antriebswelle Getriebe                                                                    | Puissance maximum transmise à l'entrée du réducteur                                                                    |                             |  |     |                              |  |
| P <sub>2</sub>                    | [kW]                          | Potenza trasmessa in uscita riduttore                                                                        | Transmitted power at gearbox output                                                                 |                              | Übertragene Leistung Abtriebswelle Getriebe                                                                        | Puissance transmise à la sortie du réducteur                                                                           |                             |  |     |                              |  |
| P <sub>n</sub>                    | [kW]                          | Potenza nominale motore                                                                                      | Motor rated power                                                                                   |                              | Nennleistung Motor                                                                                                 | Puissance nominale moteur                                                                                              |                             |  |     |                              |  |
| P <sub>r1</sub>                   | [kW]                          | Potenza richiesta in entrata                                                                                 | Required input power                                                                                |                              | Verlangte Leistung Antriebswelle                                                                                   | Puissance requise en entrée                                                                                            |                             |  |     |                              |  |
| P <sub>r2</sub>                   | [kW]                          | Potenza in uscita a n <sub>2</sub> max                                                                       | Output power at n <sub>2</sub> max                                                                  |                              | Abtriebsleistung bei n <sub>2</sub> max                                                                            | Puissance en sortie à n <sub>2</sub> max                                                                               |                             |  |     |                              |  |
| P <sub>r2'</sub>                  | [kW]                          | Potenza in uscita a n <sub>2</sub> min                                                                       | Output power at n <sub>2</sub> min                                                                  |                              | Abtriebsleistung bei n <sub>2</sub> min                                                                            | Puissance en sortie à n <sub>2</sub> min                                                                               |                             |  |     |                              |  |
| P <sub>s</sub>                    | [kW]                          | Potenza da smaltire                                                                                          | Excess power                                                                                        |                              | Überleistung                                                                                                       | Puissance à éliminer                                                                                                   |                             |  |     |                              |  |
| P <sub>t</sub>                    | [kW]                          | Potenza termica riduttore                                                                                    | Gearbox thermal capacity                                                                            |                              | Termische Grenzleistung Getriebe                                                                                   | Puissance thermique réducteur                                                                                          |                             |  |     |                              |  |
| Q                                 | [l/min]                       | Portata olio idraulico                                                                                       | Hydraulic flow rate                                                                                 |                              | Durchflußmenge des Hydrauliköls                                                                                    | Débit d'huile hydraulique                                                                                              |                             |  |     |                              |  |
| R <sub>c1</sub>                   | [N]                           | Carico radiale (di calcolo) in entrata riduttore                                                             | Calculated radial load of gearbox input shaft                                                       |                              | Radialkräfte auf Antriebswelle Getriebe - Berechnungsgrundlage                                                     | Charge radiale de calcul à l'entrée du réducteur                                                                       |                             |  |     |                              |  |
| R <sub>c2</sub>                   | [N]                           | Carico radiale (di calcolo) in uscita riduttore                                                              | Calculated radial load of gearbox output shaft                                                      |                              | Radialkräfte auf Abtriebswelle Getriebe - Berechnungsgrundlage                                                     | Charge radiale de calcul à la sortie du réducteur                                                                      |                             |  |     |                              |  |
| R <sub>x1</sub>                   | [N]                           | Carico radiale nominale in entrata riduttore ricalcolato rispetto a diversi punti di applicazione del carico | Rated radial load at gearbox input re-calculated with respect to different load application points  |                              | Nachrechnung der Nenn-Radialkräfte auf die Antriebswelle des Getriebes bei verschiedenen Angriffspunkten der Kraft | Charge radiale nominale à l'entrée du réducteur recalculée par rapport à différents points d'application de la charge  |                             |  |     |                              |  |
| R <sub>x2</sub>                   | [N]                           | Carico radiale nominale in uscita riduttore ricalcolato rispetto a diversi punti di applicazione del carico  | Rated radial load at gearbox output re-calculated with respect to different load application points |                              | Nachrechnung der Nenn-Radialkräfte auf die Abtriebswelle des Getriebes bei verschiedenen Angriffspunkten der Kraft | Charge radiale nominale à la sortie du réducteur recalculée par rapport à différents points d'application de la charge |                             |  |     |                              |  |
| t <sub>a</sub>                    | [°C]                          | Temperatura ambiente                                                                                         | Ambient temperature                                                                                 |                              | Umgebungstemperatur                                                                                                | Température ambiante                                                                                                   |                             |  |     |                              |  |
| V                                 | [cm <sup>3</sup> ]            | Cilindrata motore idraulico                                                                                  | Hydraulic motor displacement                                                                        |                              | Hubraum - Hydraulikmotor                                                                                           | Cylindrée moteur hydraulique                                                                                           |                             |  |     |                              |  |
| V <sub>c</sub>                    | [cm <sup>3</sup> ]            | Cilindrata motore idraulico (di calcolo)                                                                     | (Theoretical) Hydraulic motor displacement                                                          |                              | Hubraum - Hydraulikmotor (kalkuliert)                                                                              | Cylindrée moteur hydraulique (de calcul)                                                                               |                             |  |     |                              |  |
| X                                 | [mm]                          | Distanza di applicazione del carico dallo spallamento albero                                                 | Load application distance from shaft shoulder                                                       |                              | Abstand des Kraftangriffspunktes vom Wellenansatz                                                                  | Distance d'application de la charge par rapport à l'épaulement de l'arbre                                              |                             |  |     |                              |  |
| η <sub>d</sub>                    |                               | Rendimento dinamico                                                                                          | Dynamic efficiency                                                                                  |                              | Dinamische Wirkungsgrad                                                                                            | Rendement dynamique                                                                                                    |                             |  |     |                              |  |
| Z                                 |                               | Frequenza di avviamento                                                                                      | Frequency of starts                                                                                 |                              | Anlaßfrequenz                                                                                                      | Frequence de démarrage                                                                                                 |                             |  |     |                              |  |

|                                                                                                                |                                                                                                            |                                                                                                           |                                                                                                    |
|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|                                |                           |                          |                 |
| Simbolo riferito ai pesi dei riduttori.                                                                        | Symbol referring to weight of gearboxes.                                                                   | Symbol für das Gewicht der Getriebe.                                                                      | Symbole se référant aux poids des réducteurs.                                                      |
|                                |                           |                          |                 |
| Le colonne contrassegnate da questo simbolo indicano i numeri di pagina dove sono riportate le dimensioni.     | Columns marked with this symbol indicate the reference page showing dimensions.                            | Die mit diesem Symbol gekennzeichneten Spalten geben die Nummern der Seiten mit den Maßangaben.           | Les colonnes portant ce symbole indiquent les numéros de page où sont mentionnées les dimensions.  |
|                                |                           |                          |                 |
| Questo simbolo riporta un numero che rappresenta il numero di pagina di riferimento.                           | This symbol identifies reference page number.                                                              | In diesem Symbol wird eine Nummer angegeben, die für die entsprechende Bezugsseite steht.                 | Cette image comporte un chiffre représentant le numéro de page de référence.                       |
|                                |                           |                         |                 |
| Questi simboli evidenziano il punto di montaggio degli accessori.                                              | These symbols identify the mounting positions of accessories.                                              | Durch diese Symbole werden die Montagepunkte für die Zubehörteile hervorgehoben.                          | Ces images montrent la position de montage de accessoires.                                         |
|                                |                           |                          |                 |
| Le parti in nero di questi simboli evidenziano la collocazione delle entrate dei riduttori.                    | These symbols identify the position of gearbox input (black-filled areas).                                 | Die durch die schwarze Farbe hervorgehobenen Teile, stellen die Antriebsseiten der Getriebe dar.          | Les parties noires de ces images montrent l'emplacement des entrées des réducteurs.                |
|                              |                         |                        |               |
| Il simbolo della chiave associato ad un numero indica la coppia di serraggio delle viti del giunto ad attrito. | The number associated with the wrench symbol indicates the tightening torque for friction coupling screws. | Das an eine Nummer gebundene Schlüsselsymbol steht für den Anzugsmoment der Schrauben der Reibverbindung. | L'image de la clé associée à un numéro signale le couple de serrage des vis du joint à frottement. |
|                              |                         |                        |               |
| Freno negativo a dischi multipli.                                                                              | Negative multidisc brake.                                                                                  | Negative Lamellenbremse.                                                                                  | Frein multidisques négatif.                                                                        |
|                              |                         |                        |               |
| Predisposizione motore idraulico.                                                                              | Hydraulic motor connection.                                                                                | Eingangsfansch für Hydraulikmotor.                                                                        | Adaptation pour moteur hydraulique.                                                                |
|                              |                         |                        |               |
| Coperchio per flangiatura in ingresso standard.                                                                | Cover for standard input flanging.                                                                         | Deckel für Antriebsflansche, Standardausführung.                                                          | Couvercle pour bridage d' une entrée standard.                                                     |
|                              |                         |                        |               |
| Esecuzione in linea.                                                                                           | Inline units.                                                                                              | Koaxialgetriebe.                                                                                          | Exécution coaxiale.                                                                                |
|                              |                         |                        |               |
| Esecuzione angolare.                                                                                           | Right angle units.                                                                                         | Winkelgetriebe.                                                                                           | Exécution angulaire.                                                                               |

## INFORMAZIONI GENERALI

I paragrafi che seguono riportano una serie di informazioni sugli elementi indispensabili per la scelta e il corretto utilizzo dei motoriduttori.

### 5.0 COPPIA IN USCITA

#### 5.1 Coppia di riferimento $M_2$ [Nm]

È un valore di coppia in uscita indicativo per una rapida individuazione della classe di prestazione di ogni grandezza base di riduttore.

#### 5.2 Coppia nominale $M_{n2}$ [Nm]

È la coppia nominale trasmissibile in uscita dal riduttore con carico continuo uniforme, fattore di servizio  $f_s=1$ , per diversi valori fissati del fattore di durata ( $n_2 \cdot h$ ). I valori di  $M_{n2}$  sono verificati secondo i seguenti standard: ISO DP 6336 per gli ingranaggi ISO 281 per i cuscinetti.

#### 5.3 Coppia massima $M_{2max}$ [Nm]

È il valore di coppia in uscita sopportabile dal riduttore in condizioni statiche o fortemente intermittenti. (Inteso come coppia di punta di carico istantaneo o come coppia di avviamento sotto carico).

#### 5.4 Coppia richiesta $M_{r2}$ [Nm]

Rappresenta la coppia richiesta dall'applicazione e dovrà sempre essere uguale o inferiore alla coppia in uscita nominale  $M_{n2}$  del riduttore scelto.

#### 5.5 Coppia di calcolo $M_{c2}$ [Nm]

È il valore di coppia da utilizzare per la selezione del riduttore considerando la coppia richiesta  $M_{r2}$  e il fattore di servizio  $f_s$  (tab. A3) ed è dato dalla formula:

dove  $M_{n2}$  è il valore corrispondente al fattore di durata ( $n_2 \cdot h$ ) caratteristico dell'applicazione.

### 6.0 POTENZA

#### 6.1 Potenza in entrata $P_1$ [kW]

La potenza  $P_1$  indicata nelle tabelle dati tecnici di ogni grandezza di riduttore, è quella trasmissibile in entrata in maniera intermittente o continua alle seguenti condizioni:

Velocità in ingresso  $n_1$   
Durata teorica 1000 h  
Fattore di servizio  $f_s=1$

## GENERAL INFORMATION

The following paragraphs contain information on essential elements for selection and correct use of gearmotors.

### 5.0 OUTPUT TORQUE

#### 5.1 Reference torque $M_2$ [Nm]

Indicative output torque to easily establish the performance class for each gearbox basic size.

#### 5.2 Nominal torque $M_{n2}$ [Nm]

Torque transmitted at output at uniform continuous load, service factor  $f_s=1$  for different fixed values of the life factor ( $n_2 \cdot h$ ). The  $M_{n2}$  values are tested in conformity with the following standards: ISO DP 6336 for reduction units ISO 281 for bearings.

#### 5.3 Maximum torque $M_{2max}$ [Nm]

It is the output torque that the reduction unit can withstand in static or highly intermittent conditions. (It is considered as instantaneous load peak torque or starting torque under load).

#### 5.4 Required torque $M_{r2}$ [Nm]

This is the torque corresponding to application requirements. It must always be equal to or less than rated output torque  $M_{n2}$  of the selected gearbox.

#### 5.5 Calculated torque $M_{c2}$ [Nm]

Torque value to be used for selecting the gearbox, considering required torque  $M_{r2}$  and service factor  $f_s$  (tab. A3), and is obtained by formula:

where  $M_{n2}$  is the value for the specific application taking into consideration the life factor ( $n_2 \cdot h$ ).

### 6.0 POWER

#### 6.1 Input rated power $P_1$ [kW]

Power  $P_1$  indicated in the specification tables for each gearbox size is either the intermittent or continuous power which can be transmitted at the gearbox input under the following conditions:

input speed  $n_1$   
theoretical duration 1000 h  
service factor  $f_s=1$

## ALLGEMEINE INFORMATIONEN

Die folgenden Abschnitte enthalten eine Reihe von Informationen über die Aspekte, die im Hinblick auf die Wahl und dem sachgemäßen Betrieb von Getriebemotoren unbedingt zu berücksichtigen sind.

### 5.0 ABTRIEBSMOMENT

#### 5.1 Bezugsdrehmoment $M_2$ [Nm]

Ist ein indikativer Wert eines Abtriebsdrehmoments, der ein schnelles Auffinden der Leistungsklasse jeder Getriebegrundbaugröße ermöglicht.

#### 5.2 Nenndrehmoment $M_{n2}$ [Nm]

Ist das vom Getriebe am Abtrieb übertragbare Nenndrehmoment bei einer gleichmäßigen Dauerbelastung, Betriebsfaktor  $f_s = 1$ , für verschiedene festgelegte Werte des Dauerfaktors ( $n_2 \cdot h$ ). Die Werte  $M_{n2}$  werden den folgenden Normen gemäß geprüft: ISO DP 6336 für Zahnräder ISO 281 für Lager.

#### 5.3 Maximales Drehmoment $M_{2max}$ [Nm]

Stellt den Wert des Abtriebsdrehmoments dar, mit dem das Getriebe in statischen oder Bedingungen mit häufigen Schaltungen belastet werden kann. (Wird als augenblicklicher Spitzendrehmoment oder als Anlaßdrehmoment unter Last verstanden).

#### 5.4 Verlangtes Drehmoment $M_{r2}$ [Nm]

Dies ist das von der Anwendung verlangte Drehmoment, das stets kleiner oder gleich dem Nenn-Abtriebsmoment  $M_{n2}$  des gewählten Getriebes sein muß.

#### 5.5 Soll-Drehmoment $M_{c2}$ [Nm]

Ist der Drehmomentenwert, der für die Wahl des getriebemotors unter Berücksichtigung des erforderlichen Drehmoments  $M_{r2}$  und des Betriebsfaktors  $f_s$  (tab. A3) verwendet wird. Er wird von folgender Formel gegeben:

$$M_{c2} = M_{r2} \cdot f_s < M_{n2} \quad (1)$$

wo  $M_{n2}$  der Wert ist, der dem Dauerfaktor ( $n_2 \cdot h$ ) entspricht, der für die Applikationsart charakteristisch ist.

### 6.0 LEISTUNG

#### 6.1 Leistung Antriebswelle $P_1$ [kW]

$P_1$  Die in den Tabellen der technischen Daten für jede Getriebegröße angegebene Leistung  $P_1$  entspricht der Leistung, die unter den folgenden Bedingungen im Antrieb kontinuierlich oder im Schaltbetrieb übertragbar ist:

Antriebsdrehzahl  $n_1$   
Theoretische Dauer: 1000 Stunden  
Betriebsfaktor  $f_s=1$

## INFORMATIONS GENERALES

Les paragraphes qui suivent présentent une série d'informations sur les éléments indispensables pour le choix et l'utilisation correcte des motoréducteurs.

### 5.0 COUPLE EN SORTIE

#### 5.1 Couple de référence $M_2$ [Nm]

Est une valeur de couple en sortie indicative pour une identification rapide de la classe de performance pour chaque taille de base de réducteur.

#### 5.2 Couple nominal $M_{n2}$ [Nm]

Est le couple nominal transmissible à la sortie du réducteur avec une charge uniforme et continue, facteur de service  $f_s=1$ , pour différentes valeurs fixées du facteur de durée ( $n_2 \cdot h$ ). Les valeurs de  $M_{n2}$  sont vérifiées selon les normes suivantes: ISO DP 6336 pour les engrenages ISO 281 pour les roulements.

#### 5.3 Couple maximal $M_{2max}$ [Nm]

C'est la valeur de couple en sortie que le réducteur peut supporter dans des conditions statiques ou de forte intermittence (considérée en tant que couple de pointe de charge instantanée ou couple de démarrage en charge).

#### 5.4 Couple requis $M_{r2}$ [Nm]

Il représente le couple requis par l'application et devra toujours être inférieur ou égal au couple en sortie nominal  $M_{n2}$  du réducteur choisi.

#### 5.5 Couple de calcul $M_{c2}$ [Nm]

C'est la valeur de couple à utiliser pour la sélection du réducteur en considérant le couple requis  $M_{r2}$  et le facteur de service  $f_s$  (tab. A3); elle résulte de la formule suivante:

où  $M_{n2}$  représente la valeur correspondant au facteur de durée ( $n_2 \cdot h$ ) caractéristique de l'application.

### 6.0 PUISSANCE

#### 6.1 Puissance en entrée $P_1$ [kW]

Comme indiqué aux tableaux des données techniques, pour chaque taille de réducteur, la puissance  $P_1$  est transmissible en entrée de manière intermittente ou continue aux conditions suivantes:

vitesse d'entrée  $n_1$   
durée théorique 1000 heures  
facteur de service  $f_s=1$

Occorre che sia sempre verificata la formula:

Check that the formula here below is always satisfied:

Die folgende Formel muß immer erfüllt werden:

Il faut toujours vérifier la formule suivante:

$$P_1' \cdot f_s \leq P_1 \quad (2)$$

## 6.2 Potenza in uscita P<sub>2</sub> [kW]

Questo valore rappresenta la potenza trasmessa all'uscita del riduttore. Si può calcolare con le seguenti formule:

## 6.2 Output power P<sub>2</sub> [kW]

This value is the power transmitted at gearbox output. It can be calculated with the following formulas:

## 6.2 Leistung Abtriebswelle P<sub>2</sub> [kW]

Dieser Wert repräsentiert die an der Abtriebswelle des Getriebes übertragene Leistung. Dieser Wert kann folgendermaßen berechnet werden:

## 6.2 Puissance en sortie P<sub>2</sub> [kW]

Cette valeur représente la puissance transmise à la sortie du réducteur. On peut la calculer avec les formules suivantes:

$$P_2 = P_1 \cdot \eta_d \quad (3)$$

$$P_2 = \frac{M_{r2} \cdot n_2}{9550} \quad (4)$$

## 7.0 POTENZA TERMICA P<sub>t</sub> [kW]

È il valore che indica il limite termico del riduttore (riferirsi alle tabelle dei dati tecnici relative alle varie grandezze di riduttori) ed è la potenza trasmissibile in servizio continuo con velocità  $n_1$  in ingresso di 1500 min<sup>-1</sup> ad una temperatura ambiente di 20°C senza ricorrere ad un raffreddamento ausiliario.

Per un tipo di servizio caratterizzato da una breve durata di funzionamento e da un tempo di sosta sufficientemente lungo da consentire il raffreddamento del gruppo, la potenza termica acquisita scarsa rilevanza per cui può non essere tenuta in considerazione.

Con temperatura ambiente diversa da 20°C, con servizio intermittente e con velocità  $n_1$  in ingresso diversa da 1500 min<sup>-1</sup> è possibile calcolare il valore di  $P_t$  in base al fattore termico  $f_t$  ed al fattore di velocità  $f_v$  riportati nella tabella (A1).

Verificare che sia sempre soddisfatta la relazione.

## 7.0 THERMAL POWER P<sub>t</sub> [kW]

This value indicates the gearbox's thermal capacity (refer to the technical data concerning the gearboxes under consideration) and is the power that can be transmitted under continuous duty at an input speed  $n_1$  of 1500 min<sup>-1</sup> at an ambient temperature of 20°C without using a supplementary cooling device.

For a duty cycle with short operating periods and sufficiently long pauses to allow the unit to cool, thermal power is not particularly important and therefore it does not need to be taken into consideration.

At an ambient temperature other than 20°C under intermittent duty conditions and with an input speed  $n_1$  other than 1500 min<sup>-1</sup> it is possible to calculate the  $P_t$  value according to the thermal factor  $f_t$  and the speed factor  $f_v$ , shown in table (A1).

Make sure that the following condition is always satisfied.

## 7.0 THERMISCHE GRENZ-LEISTUNG P<sub>t</sub> [kW]

Dieser Wert gibt die thermische Grenzleistung des Getriebes an (nehmen Sie hierzu Bezug auf die technischen Daten der verschiedenen Getriebegrößen) und die bei einem Dauerbetrieb übertragbaren Leistung bei einer Antriebsdrehzahl  $n_1$  von 1500 min<sup>-1</sup> bei einer Umgebungstemperatur von 20°C ohne Zusatzkühlung an.

Bei Dauerbetrieb, der durch kurze Betriebszeiten und für die Abkühlung der Baugruppe ausreichend lange Aussetzzeiten gekennzeichnet ist, hat die Wärmegrenzleistung nur geringe Bedeutung und kann deshalb vernachlässigt werden. Bei einer von den 20°C abweichenden Umgebungstemperatur, im Schaltbetrieb und bei einer von 1500 min<sup>-1</sup> abweichenden Antriebsdrehzahl  $n_1$ , kann der Wert  $P_t$  unter Zugrundelegung des Wärmefaktors  $f_t$  und des Drehzahlfaktors  $f_v$ , Werte die in der Tabelle (A1) wiedergegeben werden, berechnet werden. Überprüfen, ob folgendes Verhältnis eingehalten wird.

## 7.0 PUISSANCE THERMIQUE P<sub>t</sub> [kW]

C'est la valeur qui indique la limite thermique du réducteur et c'est la puissance transmissible en service continu avec vitesse  $n_1$  en entrée, de 1500 min<sup>-1</sup>, à une température ambiante de 20°C sans recourir à un refroidissement auxiliaire.

Pour un type de service caractérisé par une durée de fonctionnement brève et par un temps de pause suffisamment long pour permettre le refroidissement du groupe, la puissance thermique ne revêt qu'une faible importance et peut par conséquent, ne pas être prise en considération.

Avec température ambiante autre que 20°C, en service intermittent, et avec vitesse  $n_1$  en entrée autre que 1500 min<sup>-1</sup>, on peut calculer la valeur de  $P_t$  sur la base du facteur thermique  $f_t$  et du facteur de vitesse  $f_v$  indiqués sur le tableau (A1).

Vérifier que la relation suivante est toujours respectée.

$$(A1) \quad P_{r1} \leq P_t \cdot f_t \cdot f_v \quad (5)$$

| ta max. [°C]<br>ta max. [°C]<br>ta max. [°C]<br>ta maxi. [°C] |     | $f_t$                                                                                                                           |     |     |     |
|---------------------------------------------------------------|-----|---------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|
|                                                               |     | Servizio intermittente / Intermittent duty / Aussetzbetrieb / Service intermittent                                              |     |     |     |
|                                                               |     | Rapporto di intermittenza % (I) / Cyclic duration factor % (I)<br>Relative Einschaltdauer % (I) / Rapport d'intermittence % (I) |     |     |     |
|                                                               |     | 80                                                                                                                              | 60  | 40  | 20  |
| 10                                                            | 1.2 | 1.3                                                                                                                             | 1.6 | 1.8 | 2   |
| 20                                                            | 1   | 1.1                                                                                                                             | 1.3 | 1.5 | 1.7 |
| 30                                                            | 0.9 | 1                                                                                                                               | 1.2 | 1.3 | 1.5 |
| 40                                                            | 0.7 | 0.8                                                                                                                             | 0.9 | 1   | 1.2 |
| 50                                                            | 0.5 | 0.6                                                                                                                             | 0.7 | 0.8 | 0.9 |

| $n_1$ | $f_v$ |
|-------|-------|
| 750   | 1.5   |
| 950   | 1.2   |
| 1500  | 1     |
| 2000  | 0.7   |

Il rapporto di intermittenza (I)% è dato dal rapporto fra il tempo di funzionamento a carico  $t_r$  e il tempo totale ( $t_r + t_r$ ), con  $t_r$  = tempo di riposo, espresso in percentuale:

The intermittance factor (I)% is obtained from the ratio between operating time under load  $t_r$  and total time ( $t_r + t_r$ ), where rest time  $t_r$ , expressed as a percentage:

Die relative Einschaltdauer (I) % ist das Verhältnis aus der Betriebsdauer unter Last  $t_r$  und der Gesamtbetriebszeit ( $t_r + t_r$ ), mit  $t_r$  = Ruhetemperatur, ausgedrückt in Prozent:

Le rapport d'intermittence (I)% est donné par le rapport entre la durée de fonctionnement en charge  $t_r$  et le temps total ( $t_r + t_r$ ) avec  $t_r$  = temps de repos, exprimé en pour cent:

$$I = \frac{t_r}{t_r + t_r} \cdot 100 \quad (6)$$

N.B. I valori di potenza termica indicati nelle tabelle tecniche relative ad ogni grandezza, si riferiscono alle esecuzioni senza freno negativo a dischi multipli.

In caso di applicazioni con freni, interpellare la nostra organizzazione di vendita.

NOTE: The thermal power values indicated in the selection charts for each size apply to the versions without negative multidisc brake.

For the versions fitted with brakes, please contact our sales organization.

MERKE: Die in den technischen Tabellen für jede Baugröße angegebenen Werte der Wärmeleistung, beziehen sich auf die Versionen ohne Mehrfachscheiben-Negativbremse. Bei Applikationen mit Bremsen, müssen Sie sich erst mit unserem Verkaufsnetz in Verbindung setzen.

N.B. Les valeurs de puissance thermique, indiquées aux tableaux techniques relatifs à chaque taille, concernent des exécutions sans frein négatif multidisque.

En cas d'application avec frein, contacter notre organisation de vente.

## 8.0 RENDIMENTO

### 8.1 Rendimento dinamico $\eta_d$

È dato dal rapporto fra la potenza in uscita  $P_2$  e quella in entrata  $P_1$  secondo la relazione:

Il suo valore dipende dalla potenza trasmessa, dalla velocità, dal rapporto, dalla temperatura e dalla viscosità dell'olio.  
I valori max. di rendimento sono riportati nella tabella (A2) seguente.

## 8.0 EFFICIENCY

### 8.1 Dynamic efficiency $\eta_d$

Obtained from the ratio of output power  $P_2$  to input power  $P_1$  according to the following equation:

Its value is a function of the transmitted power, the speed, the reduction ratio and oil temperature and viscosity.  
The maximum efficiency values are shown in the table (A2) below.

## 8.0 WIRKUNGSGRAD

### 8.1 Dynamischer Wirkungsgrad $\eta_d$

Er ist gegeben durch das Verhältnis der Abtriebsleistung  $P_2$  zur Antriebsleistung  $P_1$ :

Sein Wert hängt von der übertragenen Leistung, der Drehzahl, dem Übersetzungsverhältnis und der Temperatur, darüber hinaus von der Öltemperatur ab.  
Die Werte des max. Wirkungsgrads werden in der in Folge angeführten Tabelle (A2) angegeben.

## 8.0 RENDEMENT

### 8.1 Rendement dynamique $\eta_d$

Il est donné par le rapport entre la puissance en sortie  $P_2$  et celle en entrée  $P_1$ :

Sa valeur dépend de la puissance transmise, de la vitesse, du rapport et de la température, ainsi que viscosité, de l'huile.  
Les valeurs max. de rendement sont indiquées sur le tableau (A2) suivant.

(A2)

| N° stadi / N° stages / Anz. Stufen / Nombre d'étages de réduction |         |         |         |
|-------------------------------------------------------------------|---------|---------|---------|
| L1                                                                | L2 - R2 | L3 - R3 | L4 - R4 |
| 0.97                                                              | 0.94    | 0.91    | 0.88    |

## 9.0 RAPPORTO DI RIDUZIONE i

È il rapporto fra la velocità d'entrata e d'uscita del riduttore.

## 9.0 REDUCTION RATIO i

This is the ratio of gearbox input speed to gearbox output speed.

## 9.0 ÜBERSETZUNG i

Ist das Verhältnis zwischen Antriebs- und Abtriebsdrehzahl des Getriebes.

## 9.0 RAPPORT DE REDUCTION i

Est le rapport entre la vitesse d'entrée et de sortie du réducteur.

$$i = \frac{n_1}{n_2} \quad (8)$$

## 10.0 VELOCITÀ ANGOLARE

### 10.1 Velocità in entrata $n_1$ [min<sup>-1</sup>]

È la velocità del motore di azionamento nel caso in cui questo sia collegato direttamente in asse al riduttore. Oppure quella risultante sempre dal motore e da eventuali rapporti di trasmissione nel caso di azionamento indiretto, ad esempio con cinghie.

La velocità in ingresso non deve mai superare i valori indicati nelle tabelle dati tecnici dei riduttori.

Per funzionamento in continuo in applicazioni industriali è raccomandabile non superare la velocità di 1750 min<sup>-1</sup>.

## 10.0 ANGULAR SPEED

### 10.1 Input speed $n_1$ [min<sup>-1</sup>]

Refers to the speed of motor if motor is directly connected to gearbox. In the case of an indirect drive, this value is the speed of the motor divided by the transmission ratio of the indirect drive accessory (belt, chain, etc.).

Input speed should exceed the values indicated in the tables on gearbox technical features.

As for continuous operation in industrial applications, we recommend that speed of 1750 min<sup>-1</sup> be never exceeded.

## 10.0 DREHZAHL

### 10.1 Drehzahl Antriebswelle $n_1$ [min<sup>-1</sup>]

Ist die Geschwindigkeit des Antriebsmotors, wenn dieser direkt auf Achse mit dem Getriebe verbunden ist. Kann aber auch die Geschwindigkeit darstellen, die sich immer aus dem Motor und aus eventuellen Übersetzungsverhältnissen im Fall eines indirekten Antriebs ergibt, z.B. bei einem Riemenantrieb.

Die Antriebsgeschwindigkeit darf die in den Tabellen der Getriebe angegebenen Werte nie überschreiten.

Bei einem Dauerbetrieb im industriellen Einsatz wird empfohlen, die Geschwindigkeit von 1750 min<sup>-1</sup> nicht zu überschreiten.

## 10.0 VITESSE ANGULAIRE

### 10.1 Vitesse d'entrée $n_1$ [min<sup>-1</sup>]

C'est la vitesse du moteur d'entraînement, au cas où celui-ci serait directement accouplé au réducteur de manière axiale. Ou bien la vitesse débouchant toujours du moteur, et des rapports de transmission éventuels, en cas d'entraînement indirect par exemple par courroies.

La vitesse en entrée ne doit jamais dépasser les valeurs indiquées aux tableaux des données techniques des réducteurs.

En cas de fonctionnement en continu pour des applications industrielles, on préconise de ne pas dépasser la vitesse de 750 min<sup>-1</sup>.

### 10.2 Velocità in uscita $n_2$ [min<sup>-1</sup>]

È in funzione della velocità in entrata  $n_1$  e del rapporto di riduzione i secondo la relazione:

### 10.2 Output speed $n_2$ [min<sup>-1</sup>]

Calculated from input speed  $n_1$  and transmission ratio i according to the following equation:

### 10.2 Abtriebsdrehzahl $n_2$ [min<sup>-1</sup>]

Sie ist abhängig von der Abtriebsdrehzahl  $n_1$  und der Übersetzung i nach folgender Gleichung:

### 10.2 Vitesse en sortie $n_2$ [min<sup>-1</sup>]

Elle varie en fonction de la vitesse d'entrée  $n_1$  et du rapport de réduction i selon l'équation:

$$n_2 = \frac{n_1}{i} \quad (9)$$

### 11.0 FATTORE DI SERVIZIO $f_s$

È un fattore che definisce il tipo di applicazione. Tiene conto con sufficiente approssimazione della variabilità del carico a cui è sottoposto il riduttore per un determinato tipo di servizio. Tiene conto anche del tipo di azionamento del riduttore, con motore elettrico, idraulico ecc.

La tabella (A3) dà una indicazione per la scelta del fattore di servizio più opportuno in funzione del tipo di applicazione e del tipo di motore di azionamento.

### 11.0 SERVICE FACTOR $f_s$

Factor depending on the application type. This factor takes into consideration (with sufficient approximation) load variations which the gearbox may undergo for a specific type of duty. It also takes into consideration the selected type of the drive unit, e.g. electric or hydraulic motor and so on.

Table (A3) gives indications for the service factor to be selected according to the application and operation type.

### 11.0 BETRIEBSFAKTOR $f_s$

Ist ein Faktor, der die Art der Applikation definiert. Er berücksichtigt, mit einer ausreichenden Annäherung, die Belastungsschwankungen, denen das Getriebe bei einer bestimmten Betriebsart unterliegt. Berücksichtigt auch die Antriebsart der Getriebe, d.h. mittels Elektromotor, hydraulischem Motor, usw.

Die Tabelle (A3) gibt einen Anhaltspunkt für die Auswahl des, im Hinblick auf die Applikation und dem Betrieb angemessenen Betriebsfaktors.

### 11.0 FACTEUR DE SERVICE $f_s$

C'est un facteur définissant le type d'application. Il prend en compte, avec une approximation satisfaisante, la variabilité de la charge à laquelle le réducteur est soumis, pour un genre de service donné. Il considère également le type d'entraînement du réducteur, avec moteur électrique, hydraulique, etc.

Le tableau (A3) donne une indication pour le choix du facteur de service qui convient davantage au genre d'application et de fonctionnement.

(A3)

| Fattori di servizio / Service factors / Betriebsfaktoren / Facteurs de service                                   |                                                                                                                                                                                                                                  |                                                                                     |      |      |      |      |
|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|------|------|------|
| Natura del carico<br>Type of load<br>Belastungsart<br>Nature de la charge                                        | Tipo di azionamento<br>Type of drive unit<br>Antriebsart<br>Type d'entrainement                                                                                                                                                  | N° avviamenti /h<br>Number of starts/hour<br>Schaltungen/Std.<br>N.bre démarrages/h |      |      |      |      |
|                                                                                                                  |                                                                                                                                                                                                                                  | 16                                                                                  | 32   | 63   | 125  | 250  |
| Uniforme<br>Uniform load<br>Gleichmäßig<br>Uniforme                                                              | Mot. elettrico / Electric motor / Elektromotor / Moteur electrique<br>Mot. idraulico / Hydraulic motor / Hydraulikmotor / Mot. hydraulique<br>Mot. endotermico / Endothermic engine / Endotermischer Motor /Moteur endothermique | 1.00                                                                                | 1.10 | 1.15 | 1.25 | 1.40 |
|                                                                                                                  |                                                                                                                                                                                                                                  | 1.00                                                                                | 1.00 | 1.10 | 1.15 | 1.20 |
|                                                                                                                  |                                                                                                                                                                                                                                  | 1.25                                                                                | —    | —    | —    | —    |
| Variabile con urti moderati<br>Moderate shock load<br>Variable mit mäßigen Stößen<br>Variable avec chocs modérés | Mot. elettrico / Electric motor / Elektromotor / Moteur electrique<br>Mot. idraulico / Hydraulic motor / Hydraulikmotor / Mot. hydraulique<br>Mot. endotermico / Endothermic engine / Endotermischer Motor /Moteur endothermique | 1.10                                                                                | 1.15 | 1.20 | 1.40 | 1.60 |
|                                                                                                                  |                                                                                                                                                                                                                                  | 1.00                                                                                | 1.00 | 1.10 | 1.20 | 1.30 |
|                                                                                                                  |                                                                                                                                                                                                                                  | 1.50                                                                                | —    | —    | —    | —    |
| Variabile con urti forti<br>Heavy shock load<br>Variable mit starken Stößen<br>Variable avec chocs fort          | Mot. elettrico / Electric motor / Elektromotor / Moteur electrique<br>Mot. idraulico / Hydraulic motor / Hydraulikmotor / Mot. hydraulique<br>Mot. endotermico / Endothermic engine / Endotermischer Motor /Moteur endothermique | 1.20                                                                                | 1.30 | 1.40 | 1.60 | 1.80 |
|                                                                                                                  |                                                                                                                                                                                                                                  | 1.10                                                                                | 1.20 | 1.25 | 1.35 | 1.50 |
|                                                                                                                  |                                                                                                                                                                                                                                  | 2.00                                                                                | —    | —    | —    | —    |

### 12.0 FATTORE DI DURATA ( $F_{h1}$ , $F_{h2}$ )

È un fattore derivato dal prodotto della velocità angolare in entrata  $n_1$  o in uscita  $n_2$  per le ore di effettivo funzionamento  $h$ , esclusi i tempi di sosta.

### 12.0 LIFE FACTOR ( $F_{h1}$ , $F_{h2}$ )

Factor resulting by multiplying angular speed at input ( $n_1$ ) or output ( $n_2$ ) by actual operating working hours  $h$ , break times excluded.

### 12.0 DAUERFAKTOR ( $F_{h1}$ , $F_{h2}$ )

Ist ein vom Ergebnis aus der Drehzahl im Antrieb  $n_1$  oder am Abtrieb  $n_2$  für die effektiven Betriebsstunden  $h$ , die Stillstandszeiten ausgenommen, abgeleiteter Faktor.

### 12.0 FACTEUR DE DURÉE ( $F_{h1}$ , $F_{h2}$ )

C'est un facteur découlant du résultat de la vitesse angulaire en entrée  $n_1$  ou en sortie  $n_2$  multipliée par les heures de service effectif  $h$ , le temps d'arrêt tout exclus.

$$F_{h1} = (n_1 \cdot h) \quad (10)$$

$$F_{h2} = (n_2 \cdot h) \quad (11)$$

Il fattore di durata è direttamente proporzionale al numero di rotazioni che compie il riduttore nella sua intera durata di servizio.

Life factor is directly proportional to gearbox rpms during the whole duty time.

Der Dauerfaktor steht proportional direkt zur Anzahl der Umdrehungen, die das Getriebe in seiner gesamten Betriebsdauer durchläuft.

Le facteur de durée est indirectement proportionnel au nombre de rotations que le réducteur accomplit dans la durée de service globale.

### 13.0 SCELTA

Per selezionare correttamente un riduttore o un motoriduttore è necessario disporre di alcuni dati fondamentali sintetizzati nella tabella (A4).

Una copia di questa può essere inviata alla nostra Organizzazione di vendita per la ricerca della selezione del riduttore più idoneo al tipo di applicazione.

### 13.0 SELECTION

Some essential data are necessary for a proper gearbox or gearmotor selection as indicated in Table (A4).

Fill in the table and send a copy to our Technical Service Department which will select the most suitable gearbox for your application requirements.

### 13.0 ANTRIEBSAUSWAHL

Um ein Getriebe oder einen Getriebemotor in korrekter Weise auswählen zu können, muß man über einige grundsätzliche Daten verfügen. Daten, die auf der Tabelle (A4) zusammengefaßt werden. Eine Kopie dieser Tabelle kann an unsere Verkaufsorganisation gesendet werden, um in dieser Weise gemeinsam die Wahl des für die jeweilige Applikationsart geeignetsten Getriebes treffen zu können.

### 13.0 SELECTION

Pour le bon choix du réducteur ou du motoréducteur il faut disposer de certaines données fondamentales, comme résumées au tableau (A4).

Un exemplaire de celui-ci peut être envoyé à notre Organisation de vente, afin de réaliser une sélection de réducteur qui s'adapte le mieux au genre d'application.

(A4)

Tipo di applicazione  
Type of application  
Anwendung  
Type d'application .....

Tipo di motore e azionamento / Type of motor and drive unit  
Typ des Antriebsmotors / Type de moteur et entraînement

☐ Elettrico  
Electric  
Elektrisch  
Electrique

☐ Idraulico  
Hydraulic  
Hydraulisch  
Hydraulique

☐ Altri  
Others  
Anderer  
Autres

**RIDUTTORE / GEARBOX / GETRIEBE / REDUCTEUR**

$P_{12}$  Potenza richiesta in uscita  
Required output power  
Am Abtrieb erforderliche Leistung  
Puissance nécessaire en sortie ..... kW

$M_{12}$  Coppia richiesta in uscita  
Required output torque  
Am Abtrieb erforderliches Drehmoment  
Couple nécessaire en sortie ..... Nm

$n_2$  Velocità in uscita  
Output speed  
Abtriebsdrehzahl  
Vitesse en sortie ..... min<sup>-1</sup>

$n_1$  Velocità in entrata  
Input speed  
Antriebsdrehzahl  
Vitesse en entrée ..... min<sup>-1</sup>

$R_{c2}$  Carico radiale su albero in uscita  
Radial load on output shaft  
Radialkraft auf Abtriebswelle  
Charge radiale sur l'arbre de sortie ..... N

$X_2$  Distanza di applicazione del carico  
Load application distance  
Abstand des Kraftangriffspunktes  
Distance d'application de la charge ..... mm (\*)

$R_{c1}$  Carico radiale su albero in entrata  
Radial load on input shaft  
Radialkraft auf Antriebswelle  
Charge radiale sur l'arbre d'entrée ..... N

$X_1$  Distanza di applicazione del carico  
Load application distance  
Abstand des Kraftangriffspunktes  
Distance d'application de la charge ..... mm (\*)

$A_{c2}$  Carico assiale su albero in uscita  
Thrust load on output shaft  
Axialkraft auf Abtriebswelle  
Charge axiale sur l'arbre de sortie ..... N (°)

$A_{c1}$  Carico assiale su albero in entrata  
Thrust load on input shaft  
Axialkraft auf Antriebswelle  
Charge axiale sur l'arbre d'entrée ..... N (°)

$h$  Durata di vita  
Requested life time  
Lebensdauer  
Durée de vie ..... h

$t_a$  Temperatura ambiente  
Ambient temperature  
Umgebungstemperatur  
Température ambiante ..... °C

Esecuzione ☐ In linea ☐ Angolare  
Type Linear Right angle  
Ausführung In Reihe Auf Winkel  
Exécution Linéaire Angulaire

Versione uscita  
Output version  
Abtriebsversion  
Version sortie .....

Accessori  
Accessories  
Zubehör  
Accessoires .....

Posizione di montaggio  
Mounting position  
Montageposition  
Position de montage .....

**MOTORE ELETTRICO / ELECTRIC MOTOR  
ELEKTROMOTOR / MOTEUR ELECTRIQUE**

Grandezza IEC  
IEC size  
IEC Baugröße  
Taille CEI .....

$P_n$  Potenza nominale  
Rated power  
Nennleistung  
Puissance nominale ..... kW

Tensione di alimentazione  
Motor voltage  
Nennspannung des Motors  
Tension d'alimentation moteur ..... V

$N^{\circ}$  poli / Number of poles / Anzahl der Pole / N.bre de pôles

Frequenza  
Frequency  
Frequenz  
Fréquence ..... Hz

Fattore di intermittenza in accordo a CEI  
Duty type to IEC norms  
Relative Einschaltdauer gemäß CEI  
Type de service selon CEI S...../.....%

$Z$  Frequenza di avviamento  
Starting frequency  
Schaltungshäufigkeit  
Fréquence de démarrage ..... 1/h

Grado di protezione motore  
Motor protection degree  
Schutzart des Motors  
Degré de protection moteur IP.....

Classe di isolamento  
Insulation class  
Isolierstoffklasse  
Classe d'isolation .....

**FRENO SU MOTORE AUTOFRENANTE  
BRAKE IN SELF-BRAKING MOTOR  
BREMSE AUF SELBSTBREMSENDEM MOTOR  
FREIN SUR MOTEUR AUTOFREINE**

Tensione di alimentazione freno  
Brake voltage  
Nennspannung der Bremse  
Tension d'alimentation du frein ..... V

$M_b$  Coppia frenante  
Brake torque  
Bremsmoment  
Couple de freinage ..... Nm

**MOTORE IDRAULICO / HYDRAULIC MOTOR  
HYDRAULIKMOTOR / MOTEUR HYDRAULIQUE**

Marca / Brand / Marke / Marque .....

Tipo / Type / Typ / Type .....

$V$  Cilindrata max./min.  
Min./max. displacement  
Max./min. Hubraum  
Cylindrée max/min ..... cm<sup>3</sup>

$p$  Pressione max. di esercizio  
Max. operating pressure  
Max. Betriebsdruck  
Pression max. de service ..... bar

$Q$  Portata max. di esercizio  
Max. operating flow rate  
Max. Ölstrom  
Débit max. de service ..... l/min

**FRENO IDRAULICO  
HYDRAULIC BRAKE  
HYDRAULISCHE BREMSE  
FREIN HYDRAULIQUE**

☐ si/yes/ja/oui ☐ no/non/nein/non

$M_b$  Coppia frenante  
Brake torque  
Bremsdrehmoment  
Couple de freinage ..... Nm

N.B: Tab. (A4)

- (\*) La distanza  $X_{1-2}$  è quella compresa fra il punto di applicazione della forza e la battuta dell'albero (se non indicata, si considererà la forza agente sulla mezziera della sporgenza dell'albero).
- (\*) + = compressione  
- = trazione

#### N.B.

I criteri di scelta e i dati tecnici riportati in questo catalogo non sono validi per tutte le applicazioni, come ad esempio impianti di sollevamento, dove il riduttore funziona come organo di sicurezza verso persone e/o cose.

In questi casi la selezione del riduttore deve essere fatta con criteri specifici, ed eventualmente in accordo alle vigenti norme di sicurezza, per cui è necessario interpellare l'Organizzazione di vendita TRASMITAL BONFIGLIOLI.

N.B: Table (A4)

- (\*) Distance  $X_{1-2}$  is between force application point and shaft shoulder (if not indicated the force exerted on the mid-point of the shaft extension will be considered).
- (\*) + = compression  
- = traction

#### NOTE:

The selection criteria and specifications reported in this catalogue are not valid for any applications, including those where the gearbox is to serve as a safety device preventing injury to persons or damage to objects, as is the case with hoisting equipment.

For these applications, however, the gearbox should be selected following specific criteria and in accordance with any safety rules in force. For this reason, we recommend that you seek advice from TRASMITAL BONFIGLIOLI sales organization.

N.B: Tab. (A4)

- (\*) Der Abstand  $X_{1-2}$  ist der Abstand vom Kraftangriffspunkt zum Wellenansatz (wenn nicht anders angegeben, wird davon ausgegangen, daß die Kraft auf der Mitte des Wellenendes angreift).
- (\*) + = Druck  
- = Zug

#### MERKE:

Die Auswahlkriterien und die technischen Daten, die in diesem Katalog aufgeführt werden, sind nicht für alle Applikationsarten gültig, wie z.B. an Hebeanlagen, wo das Getriebe die Funktion eines Sicherheitsorgans im Hinblick auf den Personenschutz hat. In diesen Fällen muß die Getriebewahl unter Anwendung spezifischer Kriterien und eventuell in Übereinstimmung mit den Sicherheitsnormen erfolgen. Es ist daher erforderlich, daß Sie sich diesbezüglich mit einer Verkaufsstelle der TRASMITAL BONFIGLIOLI in Verbindung setzen.

N.B: Tab. (A4)

- (\*) La distance  $X_{1-2}$  est celle comprise entre le point d'application de la force et l'épaulement de l'arbre (si non précisée l'on considèrera la force agissant au milieu de la saillie de l'arbre).
- (\*) + = compression  
- = traction

#### N.B.

Les critères de sélection et les données techniques indiqués dans ce catalogue ne sont pas valables pour toutes les applications, telles que les équipements de levage, où le réducteur a fonction d'organe de sécurité vis-à-vis du personnel et des matériels.

Dans ces cas, la sélection du réducteur doit être faite avec des critères spécifiques, et, s'il y a lieu, en conformité avec les règles de sécurité en vigueur; c'est pourquoi il faut consulter l'organisation de vente TRASMITAL BONFIGLIOLI.

### 13.1 Scelta del tipo di riduttore

- a) In base al tipo di applicazione definire:
- Fattore di servizio  $f_s$  (tab A3)
  - La durata di funzionamento richiesta  $h$
  - Il tipo di azionamento idraulico, elettrico, altro.
- b) Con il valore della coppia richiesta in uscita  $M_{r2}$ , determinare la coppia di calcolo:

- c) Con la durata richiesta  $h$  e la velocità di uscita  $n_2$  calcolare il fattore di durata:

- d) Calcolare il rapporto di riduzione richiesto:

- e) Selezionare la grandezza del riduttore che con il rapporto più vicino a quello calcolato soddisfi la seguente condizione:

dove  $M_{n2}$  e  $F_{h2}$  sono riportati sulle tabelle dati tecnici di ogni grandezza di riduttore.

### 13.1 Gearbox selection

- a) Determine the following according to the required application:
- Service factor  $f_s$  (tab. A3)
  - required gearbox working life  $h$
  - required drive unit (hydraulic, electric or others).
- b) Define the calculated torque with the required output torque  $M_{r2}$ :

- c) Calculate the life factor with required working life  $h$  and output speed  $n_2$ :

- d) Calculate the required reduction ratio:

- e) Select gearbox size which, having a reduction ratio close to the calculated value, which satisfies the following:

where  $M_{n2}$  and  $F_{h2}$  are indicated in the tables on technical features for each gearbox size.

### 13.1 Wahl des Getriebetyps

- a) In Basis auf die Applikationsart muß folgendes bestimmt werden:
- Betriebsfaktor  $f_s$  (tab. A3)
  - Die erforderliche Betriebsdauer  $h$
  - Die Antriebsart - hydraulisch, elektrisch, o.a.
- b) Mit dem Wert des am Abtrieb  $M_{r2}$  erforderlichen Drehmoments das Soll-Drehmoment bestimmen:

- c) Mit der erforderlichen Dauer  $h$  und der Abtriebsdrehzahl  $n_2$ , den Dauerfaktor kalkulieren:

- d) Das erforderliche Übersetzungsverhältnis kalkulieren:

- e) Die Getriebebaugröße, die mit ihrem Übersetzungsverhältnis dem soeben kalkulierten Wert am nächsten kommt und die folgende Bedingung einhält, wählen:

wo  $M_{n2}$  und  $F_{h2}$  auf den, zu jeder Getriebegröße gehörenden Tabellen der technischen Daten wiedergegeben werden.

### 13.1 Sélection type de réducteur

- a) Sur la base du type d'application il faut définir:
- Facteur de service  $f_s$  (tab. A3)
  - Durée de fonctionnement nécessaire  $h$
  - Type d'entraînement hydraulique, électrique, ou autres.
- b) Avec la valeur du couple nécessaire en sortie  $M_{r2}$  déterminer le couple de calcul:

- c) Avec la durée nécessaire  $h$  et la vitesse de sortie  $n_2$  calculer le facteur de durée:

- d) Calculer le rapport de réduction nécessaire:

- e) Sélectionner la taille du réducteur qui, avec le rapport le plus proche à celui calculé, puisse satisfaire à la condition suivante:

où  $M_{n2}$  et  $F_{h2}$  ont été indiquées aux tableaux de données techniques de chaque taille de réducteur.

Nel caso di applicazioni caratterizzate da variazioni notevoli della coppia richiesta  $M_{r2}$  e della velocità  $n_2$  una selezione più appropriata può essere fatta considerando una coppia richiesta equivalente data da:

In case of applications in which the required torque  $M_{r2}$  and speed  $n_2$  vary within a wide range, best selection could be an equivalent required torque given by:

Bei Applikationen, die sich durch erhebliche Variationen des erforderlichen Drehmoments  $M_{r2}$  und der Drehzahl  $n_2$  kennzeichnen, kann eine angemessenere Lösung unter Berücksichtigung eines erforderlichen gleichwertigen Drehmoments, gefunden werden. Sie wird von folgenden Berechnungen gegeben:

En cas d'applications caractérisées par des variations importantes du couple nécessaire  $M_{r2}$  et de la vitesse  $n_2$ , une sélection appropriée peut être établie en considérant un couple nécessaire équivalent découlant de :

$$M_{r2} = \sqrt[4]{\frac{(n_2 \cdot h)_A \cdot M_A^4 + (n_2 \cdot h)_B \cdot M_B^4 + (n_2 \cdot h)_C \cdot M_C^4 + \dots}{(n_2 \cdot h)_A + (n_2 \cdot h)_B + (n_2 \cdot h)_C + \dots}} \quad (17)$$

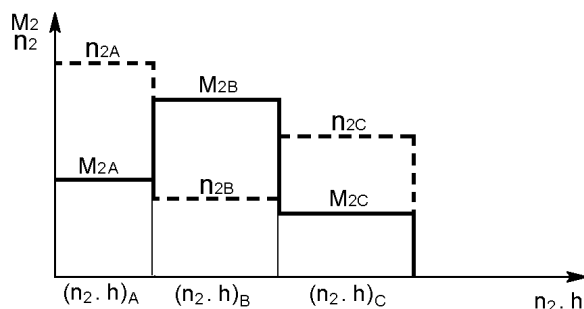
riferita a:

referred to:

bezogen auf:

référé à:

(A5)



e calcolando il fattore di durata  $F_h$  con:

and calculating the life factor  $F_h$  with:

und durch ein Kalkulieren des Dauerfaktors  $F_h$  mit:

en calculant le facteur de durée  $F_h$  par :

$$F_{h \text{ calc}} = (n_2 \cdot h)_A + (n_2 \cdot h)_B + (n_2 \cdot h)_C + \dots \quad (18)$$

Seguire poi la stessa procedura indicata con d); e).

Then follow the same procedure as specified in d) and e).

Dann die unter d.) und e.) aufgeführte Vorgangsweise befolgen.

Adopter par la suite la même procédure indiquée par d) ; e).

#### 14.0 VERIFICHE

#### 14.0 VERIFICATION

#### 14.0 PRÜFUNGEN

#### 14.0 VERIFICATIONS

Effettuata la corretta selezione si raccomanda di procedere alle seguenti verifiche:

After selecting the drive units, please check the following:

Nach Wahl des Getriebemotors folgende Prüfungen ausführen:

Après avoir effectué une sélection correcte des motorisations, nous conseillons de procéder aux vérifications suivantes:

##### a) Potenza termica

Assicurarsi che la potenza termica del riduttore, indicata nelle tabelle dati tecnici abbia un valore uguale o maggiore alla potenza richiesta dall'applicazione secondo la relazione (5) a pag. 9, in caso contrario selezionare un riduttore di grandezza superiore oppure provvedere ad applicare un sistema di raffreddamento ausiliario (vedi cap. 45 a pag. 220).

##### a) Thermal power

Make sure that the thermal power of the gearbox (shown in the tables in the chapters dealing with the gear unit series captioned) is equal to or greater than the the power required by the application according to equation (5) on page 9. If this condition is not respected, select a larger gearbox or apply a forced cooling system (see chap. 45 at a page 220).

##### a) Thermische Grenzleistung

Sicherstellen, daß die Wärme-grenzleistung des Getriebes, die in den Tabellen in den Kapiteln über die betreffenden Getriebeserien angegeben ist, größer oder gleich der verlangten Leistung ist, die von der Anwendung nach Gleichung (5) auf S. 9 verlangt wird. Andernfalls ein größer dimensioniertes Getriebe wählen bzw. ein Zwangskühlsystem vorsehen Siehe Abschnitt 45, Seite 220).

##### a) Puissance thermique

S'assurer que la puissance thermique du réducteur, indiquée dans les tableaux repris dans les chapitres relatifs à la série de réducteurs concernée, ait une valeur supérieure ou égale à la puissance requise par l'application selon l'équation (5) page 9. Dans le cas contraire, sélectionner un réducteur de taille supérieure ou bien prévoir un système de refroidissement forcé (voir par. 45 à page 220).

##### b) Coppia massima

Verificare che la coppia massima (intesa come coppia di punta di carico istantaneo o come coppia di avviamento sotto carico) non superi il valore di  $M_{2max}$  ammesso dal riduttore. (Riferirsi alle tabelle dei dati tecnici relative alle varie grandezze de riduttori).

##### b) Maximum torque

Make sure that the maximum torque (considered as instantaneous load peak torque or starting torque under load) does not exceed the  $M_{2max}$  value that the gearbox can withstand. (Refer to the technical data tables concerning the gearboxes sizes.)

##### b) Max. Drehmoment

Überprüfen, ob das maximale Drehmoment (als augenblicklicher Spitzendrehmoment oder als Anlaßdrehmoment unter Last verstanden) den seitens des Getriebes zulässigen Wert  $M_{2max}$  auch nicht überschreitet. (Nehmen Sie diesbezüglich Bezug auf die Tabelle der rechnischen Daten, welche die verschiedenen Getriebegrößen anführen).

##### b) Couple maximum

Vérifier que la couple maximal (considéré en tant que couple de pointe de charge instantanée ou couple de démarrage en charge) ne dépasse pas la valeur de  $M_{2max}$  admise par le réducteur (se reporter aux tableaux des données techniques concernant les différentes tailles de réducteurs).

### c) Carichi radiali

Verificare che i carichi radiali agenti sugli alberi di entrata e uscita risultino inferiori o uguali a quelli indicati nelle relative tabelle caratteristiche o diagrammi di ogni grandezza di riduttore.

Nel caso in cui la verifica non sia soddisfatta cambiare versione uscita riduttore per quelle grandezze dove è previsto, oppure cambiare grandezza riduttore o sopportare con altri mezzi il carico.

Per effettuare la verifica procedere come segue:

determinare i carichi radiali  $R_{c1}$  in entrata e  $R_{c2}$  in uscita.

### c) Radial loads

Check that radial loads exerted on input and output shafts are lower than or equal to values indicated in the tables on gearbox technical features or charts for each gearbox size.

In case they are greater the indicated value, change either gearbox output version, gearbox size or system bearing arrangement.

To check proceed as follows:

define radial loads  $R_{c1}$  at input and  $R_{c2}$  at output.

### c) Radialkräfte

Überprüfen, ob die auf die Antriebs- und Abtriebswellen einwirkenden Radialkräfte unter den Werten, die in den entsprechenden Tabellen der technischen Eigenschaften oder in den Diagrammen für jede Getriebebauform angegeben werden liegen, oder gleichwertig sind.

Erhält man bei dieser Kontrolle ein negatives Ergebnis muß man die Abtriebsversion des Getriebes für diese Baugrößen, wo diese Möglichkeit vorgesehen ist ändern, die Getriebebaugröße wechseln, oder die Last durch anderweitige Mittel stützen.

Für die Durchführung dieser Kontrolle geht man wie folgt vor: die Radialkräfte  $R_{c1}$  am Antrieb und  $R_{c2}$  am Abtrieb bestimmen.

### c) Charges radiales

Veiller à ce que les charges radiales, appliquées sur les arbres rapides et lents, soient inférieures ou égales aux charges indiquées sur les tableaux caractéristiques ou les diagrammes de chaque taille de réducteur.

Au cas où la vérification serait négative, changer la version de sortie réducteur, pour les tailles qui le prévoient, ou changer la taille du réducteur ou encore supporter la charge par d'autres moyens.

Pour effectuer la vérification procéder comme suit:

déterminer les charges radiales  $R_{c1}$  en entrée et  $R_{c2}$  en sortie.

$$R_{c1-2} = \frac{2000 \cdot M_{c1-2} \cdot K_2}{d} \quad (19)$$

dove:

$M_{c1-2}$  Coppia di calcolo in entrata e uscita (Nm)

$d$  Diametro dell'organo montato sull'albero: (mm)  
puleggia, ingranaggio, corona per catena

$K_r$  Fattore di sollecitazione per carico radiale con i seguenti valori:  
Corona per catena 1  
Ingranaggio 1.25  
Puleggia per cinghia 1.5-2.5

in which:

$M_{c1-2}$  Input and output calculated torque (Nm)

$d$  Diameter of the part fitted onto the shaft (mm)  
pulley, gear or chain crown

$K_r$  Stress factor for radial load with following values  
Chain crown 1  
Gear 1.25  
Belt pulley 1.5-2.5

wo:

$M_{c1-2}$  Berechnungsdrehmoment im Antrieb und Abtrieb (Nm)

$d$  Durchmesser des auf die Welle montierten Organs (mm)  
Riemenscheibe, Zahnrad, Kettenkranz

$K_r$  Beanspruchungsfaktor für Radialkraft mit den folgenden Werten:  
Kettenkranz 1  
Zahnrad 1.25  
Riemenscheibe für Riemen 1.5-2.5

où:

$M_{c1-2}$  Est le couple de calcul en entrée et sortie (Nm)

$d$  Est le diamètre de l'organe monté sur l'arbre: (mm)  
poulie, engrenage, couronne de chaîne

$K_r$  Est le facteur de contrainte pour charge radiale avec les valeurs suivantes:  
Pignon à chaîne 1  
Engrenage 1.25  
Poulie de courroie 1.5-2.5

Definire la posizione assiale X del carico sull'albero, entrare con tale valore nel diagramma indicante il carico sopportabile dal riduttore  $R_{x1}$ ,  $R_{x2}$  e verificare sia soddisfatta la seguente relazione:

Define the thrust load position X onto shaft. Check this value with the chart indicating the load  $R_{x1}$  and  $R_{x2}$  bearable by the gearbox. Check that the following is satisfied:

Die Axialposition X der an der Welle anliegenden Last definieren und durch einen Vergleich dieses Werts auf dem Diagramm, welches die vom Getriebe  $R_{x1}$ ,  $R_{x2}$  tragbare Last angibt, nachprüfen, ob das folgende Verhältnis gegeben ist:

Définir la position axiale X de la charge sur l'arbre, introduire cette valeur dans le diagramme indiquant la charge supportable par le réducteur  $R_{x1}$ ,  $R_{x2}$  et vérifier que le rapport suivant est respecté:

$$R_{c1-2} \leq R_{x1-2} \cdot f_h \quad (20)$$

dove  $f_{h1-2}$  sono i fattori correttivi carichi radiali e assiali da ricavare in funzione del fattore di durata  $F_{h1}$ ,  $F_{h2}$  richiesto.

where  $f_{h1-2}$  the radial and thrust load corrective factor depending on the required life factor  $F_{h1}$  and  $F_{h2}$ .

wo  $f_{h1-2}$  den Korrekturfaktor der Radial und Axialkräfte darstellt, der im Bezug auf den geforderten Dauerfaktor  $F_{h1}$ ,  $F_{h2}$  zu erarbeiten ist.

où  $f_{h1-2}$  sont les facteurs de correction des charges radiales et axiales à rechercher en fonction du facteur de durée  $F_{h1}$ ,  $F_{h2}$  nécessaire.

### d) Carichi assiali

Provvedere a verificare il carico assiale, quando presente sull'albero di uscita, in maniera analoga alla verifica relativa al carico radiale.

Deve essere soddisfatta la seguente relazione:

### d) Thrust loads

Check the thrust load, when exerted onto the output shaft, as specified for the radial load.

The following should be satisfied:

### d) Axialkräfte

In einer, der im Hinblick auf die Kontrolle der Radialkräfte analogen Vorgangsweise, die Kontrolle der Axialkraft, falls an der Abtriebswelle anliegend, vornehmen.

Das folgende Verhältnis muß gegeben sein:

### d) Charges axiales

Vérifier la charge axiale, si existante sur l'arbre lent, pareillement à la vérification concernant la charge radiale.

La condition suivante doit être respectée :

$$\pm A_{c2} \leq \pm A_{n2} \cdot f_{h2} \quad (21)$$

Quando è presente un carico assiale combinato ad un carico radiale per una opportuna verifica interpellare la nostra Organizzazione di vendita.

When a thrust load is combined with an axial load contact our Sales Dept. for a proper checking procedure.

Ist jedoch eine Axialkraft gemeinsam mit einer Radialkraft vorhanden, müssen Sie sich für die Prüfung an unsere Verkaufsorganisation wenden.

En cas de charge axiale combinée avec une charge radiale, pour une vérification appropriée consulter notre Organisation de Vente.

## 15.0 SCELTA DEL MOTORE

### Motore elettrico

- a) Dalla coppia  $M_{r2}$ , conoscendo  $n_2$  e il rendimento dinamico  $\eta_d$ , ricavare la potenza in entrata:

La tabella (A2) a pag. 10 riporta i valori di rendimento  $\eta_d$  relativi ai vari stadi di riduzione dei riduttori della serie 300.

- b) Selezionare nelle tabelle dati tecnici motori una grandezza con potenza nominale tale da soddisfare:

Preferibilmente scegliere motori a 4 poli o superiori.

Se non diversamente indicato, la potenza  $P_n$  dei motori riportata a catalogo si riferisce al servizio continuo S1. Per i motori utilizzati in condizioni diverse da S1, sarà necessario identificare il tipo servizio previsto con riferimento alle Norme CEI 2-3/IEC 34-1. In particolare, per i servizi da S2 a S8 e per le grandezze motore uguali o inferiori a 132, è possibile ottenere una maggiorazione della potenza rispetto a quella prevista per il servizio continuo, pertanto la condizione da soddisfare sarà:

Il fattore di maggiorazione  $f_m$  è ricavabile dalla tabella (A6).

(A6)

|       | SERVIZIO / DUTY / BETRIEB / SERVICE                                           |      |      |                                                                                                                 |      |     |
|-------|-------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------------------------------------|------|-----|
|       | S2                                                                            |      |      | S3*                                                                                                             |      |     |
|       | Durata del ciclo / Cycle duration [min]<br>Zyklusdauer / Durée du cycle [min] |      |      | Rapporto di intermittenza / Cyclic duration factor (I)<br>Relative Einschaltdauer / Rapport d'intermittence (I) |      |     |
|       | 10                                                                            | 30   | 60   | 25%                                                                                                             | 40%  | 60% |
| $f_m$ | 1.35                                                                          | 1.15 | 1.05 | 1.25                                                                                                            | 1.15 | 1.1 |

\* La durata del ciclo dovrà comunque essere uguale o inferiore a 10 minuti; se superiore interpellare la nostra organizzazione di vendita.  
Rapporto di intermittenza:

$t_r$  = tempo di funzionamento a carico costante  
 $t_r$  = tempo di riposo

## 15.0 HOW TO SELECT THE MOTOR

### Electric motor

- a)  $\eta_2$  and dynamic efficiency  $\eta_d$  are known, calculate input power based on torque  $M_{r2}$  as follows:

$$P_{r1} = \frac{M_{r2} \cdot n_2}{9550 \cdot \eta_d} \quad [\text{kW}] \quad (22)$$

Table (A2) on page 10 reports the values of efficiency  $\eta_d$  related to the different reduction stages of the gearboxes of series 300.

- b) Look up the motor selection charts and select a size with such rated power to satisfy this condition:

4-pole motors and over should be preferred.

Unless otherwise specified, power  $P_n$  of motors indicated in the catalogue refers to continuous duty S1. For motors used in conditions other than S1, the type of duty required by reference to CEI 2-3/IEC 34-1 Standards must be mentioned. For duties from S2 to S8 in particular and for motor frame 132 or smaller, extra power can be obtained with respect to continuous duty power, consequently the following condition must be satisfied:

The increased power factor  $f_m$  can be obtained from table (A6).

\* Cycle duration, in any event, must be 10 minutes or less. If it is longer, please contact our technical service department.  
Intermittence ratio:

$t_r$  = operating time at constant load  
 $t_r$  = rest time

## 15.0 WAHL DES MOTOR

### Elektromotor

- a) Da man  $n_2$  und den dynamischen Wirkungsgrad  $\eta_d$  kennt, kann man aus dem Drehmoment  $M_{r2}$  nun die Antriebsleistung errechnen:

Die Tabelle (A2), Seite 10, führt die Werte des Wirkungsgrads  $\eta_d$  im Bezug auf die verschiedenen Unterstufungen der Getriebe der Serie 300 auf.

- b) In den Tabellen mit den technischen Motordaten eine Größe mit einer solchen Nennleistung wählen, welche die folgende Anforderung befriedigt:

Vorzugsweise sollten jedoch Motoren mit 4 oder mehr Polen ausgewählt werden.

Wenn nicht anders angegeben, bezieht sich die im Katalog angegebene Leistung  $P_n$  der Motoren auf Dauerbetrieb S1. Bei Motoren, die unter anderen Bedingungen als S1 eingesetzt werden, muß die vorgesehene Betriebsart unter Bezug auf die CEI-Normen 2-3/IEC 34-1 bestimmt werden. Insbesondere kann man für die Betriebsarten S2 bis S8 (und für Motorbaugrößen gleich oder niedriger als 132) eine Überdimensionierung der Leistung, relativ zu der für den Dauerbetrieb vorgesehenen Leistung erhalten; die zu erfüllende Bedingung ist dann:

Der Überdimensionierungsfaktor  $f_m$  kann der Tabelle (A6) entnommen werden.

\* Die Zyklusdauer muß in jedem Fall kleiner oder gleich 10 min sein; wenn sie darüber liegt, unseren technischen Kundendienst zu Rate ziehen.  
Relative Einschaltdauer:

$t_r$  = Betriebszeit mit konstanter Belastung  
 $t_r$  = Aussetzzeit

## 15.0 CHOIX DU MOTEUR

### Moteur électrique

- a) En connaissance de  $n_2$  et de  $\eta_d$  rendement dynamique, calculer la puissance à l'entrée au couple  $M_{r2}$ :

Le tableau (A2) à la page 10 montre les valeurs de rendement  $\eta_d$  concernant les différents étages de réduction des réducteurs série 300.

- b) Sélectionner au tableau données techniques des moteurs une taille avec puissance nominale capable de satisfaire à:

Choisir de préférence des moteurs à 4 pôles ou supérieurs.

Sauf indication contraire la puissance  $P_n$  des moteurs indiquée dans le catalogue se réfère à un service continu S1. Pour les moteurs utilisés dans des conditions différentes du service S1, il sera nécessaire d'identifier le type de service prévu en se référant aux normes CEI 2-3/IEC 34-1. En particulier, pour les services de type S2 à S8 ou pour les tailles de moteurs égales ou supérieures à 132 il est possible d'obtenir une majoration de la puissance par rapport à celle prévue pour le service continu. Par conséquent, la condition à satisfaire sera:

Le facteur de majoration  $f_m$  peut être obtenu en consultant le tableau (A6).

\* La durée du cycle devra être égale ou inférieure à 10 minutes. Si supérieure, contacter notre service technique.  
Rapport d'intermittence:

$t_r$  = temps de fonctionnement à charge constante  
 $t_r$  = temps de repos

Per servizi diversi da  $S_1$ , con un numero rilevante di inserzioni/ora si dovrà tener conto di un fattore Z (determinabile con le indicazioni riportate nel capitolo dei motori) il quale definisce il numero massimo di avviamenti specifico per l'applicazione in oggetto.

For duties other than  $S_1$  with considerable number of starts per hour, factor Z must be considered (it is ascertained by using the information in the motors chapter). Factor Z defines the maximum number of starts for the application under consideration.

Bei von dem  $S_1$  abweichenden Betriebsarten mit einer bedeutenden Anzahl an Schaltungen/Stunde muß man den Faktor Z (mittels der, im Kapitel der Motoren angeführten Angaben bestimmbar) berücksichtigen, der eine spezifische max. Anzahl an Anlässen für die betreffende Applikation festlegt.

Pour les services différents de  $S_1$ , avec un nombre important d'insertions/heure, il faudra prendre en considération un facteur Z (déterminé à l'aide des informations reportées dans le chapitre des moteurs) qui définit le nombre maximum de démarrages spécifique pour l'application concernée.

## Motore idraulico

## Hydraulic motor

## Hydraulikmotor

## Moteur hydraulique

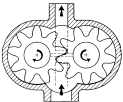
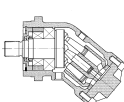
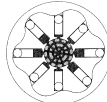
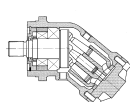
- In funzione dell'applicazione definire il tipo di motore idraulico scegliendolo dalla tabella (A7) di primo orientamento.

- Determine hydraulic motor type according to the application, choosing from the options given in guidance table (A7).

- Im Hinblick auf die Applikationsart, muß nun in der Anhaltspunktabelle (A7) der entsprechende Hydraulikmotor gewählt werden.

- D'après l'application, définir le type de moteur hydraulique en le choisissant du tableau (A7) de première orientation.

(A7)

| Tipo d'impiego<br>Duty<br>Einsatzart<br>Genre d'utilisation                  | Leggero<br>Light<br>Leicht<br>Léger                                                                                              |                                                                                                                                                   | Medio<br>Medium<br>Mittel<br>Moyen                                                                                                                               |                                                                                                                                                                | Pesante<br>Heavy<br>Schwer<br>Intensif                                                                                               |                                                                                                                                                                 |
|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pressione p [bar]<br>Pressure p [bar]<br>Druck p [bar]<br>Pression p [bar]   | <175                                                                                                                             |                                                                                                                                                   | 175 - 200                                                                                                                                                        |                                                                                                                                                                | 200 - 450                                                                                                                            |                                                                                                                                                                 |
| Costruzione motori<br>Motor design<br>Motorenbauweise<br>Construction moteur | orbitali<br>orbital<br>orbitale<br>orbitale<br> | a ingranaggi<br>gear motor<br>mit Zahnrädern<br>à engrenages<br> | a pistoni radiali<br>radial piston<br>mit Radialkolben<br>à pistons radiaux<br> | a pistoni assiali<br>axial piston<br>mit Axialkolben<br>à pistons axiaux<br> | a camme<br>cam motor<br>mit Nocken<br>à cames<br> | a pistoni assiali<br>axial piston<br>mit Axialkolben<br>à pistons axiaux<br> |
| Velocità / Speed<br>Drehzahl / Vitesse                                       | media / mean<br>mittel / moyenne<br>≤ 700                                                                                        |                                                                                                                                                   | media / mean<br>mittel / moyenne<br>≤ 500                                                                                                                        |                                                                                                                                                                | bassa / low<br>niedrig / faible<br>≤ 200                                                                                             |                                                                                                                                                                 |
| $\eta_{mh}$                                                                  | 0.80                                                                                                                             |                                                                                                                                                   | 0.95                                                                                                                                                             |                                                                                                                                                                | 0.93                                                                                                                                 |                                                                                                                                                                 |
| $\eta_v$                                                                     | 0.90                                                                                                                             |                                                                                                                                                   | 0.95                                                                                                                                                             |                                                                                                                                                                | 0.95                                                                                                                                 |                                                                                                                                                                 |

- Con i dati caratteristici di ingresso del riduttore:  
coppia in entrata  $M_{r1}$  [Nm]  
velocità in entrata  $n_1$  [min<sup>-1</sup>]  
e con la pressione p [bar] ammessa dal circuito idraulico determinare la cilindrata del motore idraulico con la seguente formula:

- Based on the specifications of gearbox input:  
input torque  $M_{r1}$  [Nm]  
input speed  $n_1$  [min<sup>-1</sup>]  
and on allowed pressure p [bar] for the hydraulic circuit, calculate the displacement of the hydraulic motor by formula:

- Anhand der charakteristischen Daten des Getriebeantriebs:  
Antriebsdrehmoment  $M_{r1}$  [Nm]  
Antriebsdrehzahl  $n_1$  [min<sup>-1</sup>]  
und mit dem vom hydraulischen Kreislauf zugelassenen Druckwert p [bar], den Hubraum des Hydraulikmotors, unter Anwendung der folgenden Formel, bestimmen:

- Avec les données caractéristiques à l'entrée du réducteur :  
couple en entrée  $M_{r1}$  [Nm]  
vitesse en entrée  $n_1$  [min<sup>-1</sup>]  
et avec la pression p [bar] admise dans le circuit hydraulique, déterminer la cylindrée du moteur hydraulique par la formule suivante:

$$V_c = \frac{20 \cdot \pi \cdot M_{r1}}{p \cdot \eta_{mh}} \text{ [cm}^3\text{]} \quad (26)$$

dove  $\eta_{mh}$  è il rendimento meccanico idraulico del motore (tab. A7).

where  $\eta_{mh}$  is the hydraulic mechanical efficiency of the motor (tab. A7).

wobei  $\eta_{mh}$  den mechanisch-hydraulischen Wirkungsgrad des Motors darstellt (tab. A7).

où  $\eta_{mh}$  représente le rendement mécanique-hydraulique du moteur (tab. A7).

- Selezionare una grandezza di motore che abbia una cilindrata V tale che:

- Select a motor size with displacement V that satisfies the following condition:

- Einen Motor mit einer Baugröße wählen, der über folgenden Hubraum V verfügt:

- Sélectionner une taille de moteur ayant une telle cylindrée V que :

$$V_c \leq V \quad (27)$$

- Calcolare la portata necessaria per alimentare il motore idraulico

- Calculate the flow required for the hydraulic motor

- Die für die Versorgung des Hydraulikmotors erforderliche Förderleistung berechnen:

- Calculer le débit nécessaire pour alimenter le moteur hydraulique

$$Q_1 = \frac{V \cdot n_1}{\eta_v \cdot 1000} \text{ [l/min]} \quad (28)$$

dove  $\eta_v$  è il rendimento volumetrico.  
Per motori idraulici orbitali di produzione TRASMITAL BONFIGLIOLI consultare il relativo capitolo del presente catalogo. Per altri tipi di motori idraulici consultare le loro relative documentazioni tecniche.

where  $\eta_v$  is volumetric efficiency.  
For hydraulic orbital motors by TRASMITAL BONFIGLIOLI, please see the relevant chapter in this catalogue. For other types of hydraulic motors, see the relevant technical literature.

wo  $\eta_v$  für den volumetrischen Wirkungsgrad steht.  
Im Bezug auf die orbitalen Hydraulikmotoren aus der Produktion TRASMITAL BONFIGLIOLI, das entsprechende Kapitel im vorliegenden Katalog konsultieren. Bezüglich anderer Hydraulikmotortypen, verweisen wir auf deren jeweilige Unterlagen.

où  $\eta_v$  représente le rendement volumétrique.  
Pour les moteurs hydrauliques orbitaux de production TRASMITAL BONFIGLIOLI, consulter le chapitre correspondant de ce catalogue. Pour d'autres types de moteurs hydrauliques consulter la documentation techniques y rattachée.

## 16.0 INSTALLAZIONE

È molto importante per l'affidabilità e il buon funzionamento del riduttore o motoriduttore rispettare alcune norme per la sua corretta installazione.

Le norme qui riportate hanno valore per una prima indicazione per la installazione del riduttore o motoriduttore.

Per provvedere ad una effettiva e corretta installazione attenersi al Manuale di installazione uso e manutenzione dei riduttori della serie 300 fornibile dalla nostra Organizzazione di Vendita.

Riportiamo in breve le norme da seguire:

### a) Fissaggio:

- Appoggiare il riduttore a una struttura sufficientemente rigida, con superfici di accoppiamento piane lavorate di macchina utensile.
- Le superfici di accoppiamento, specialmente per riduttori montati con flangia e con alberi in uscita femmina scanalati, devono risultare entro precise tolleranze geometriche (vedi manuale).
- Per alcune grandezze di riduttori, in applicazioni con elevati carichi radiali in uscita, è raccomandato il montaggio a flangia eseguito per utilizzare i doppi diametri di centraggio di cui tali riduttori sono provvisti. Vedi parte "Carichi sugli alberi" per le diverse grandezze di riduttori.
- Verificare che il riduttore sia previsto per la posizione di montaggio richiesta come illustrato nella tabella (A8) a pag. 24.
- Fissare il riduttore con viti di classe di resistenza 8.8 o superiore serrandole ai valori di coppia di serraggio indicati nelle relative tabelle.  
Per coppie massime trasmesse maggiori od uguali al 70% della coppia  $M_{2max}$  indicata e con frequenti inversioni del moto, utilizzare viti in classe minima di resistenza 10.9.  
Alcune grandezze di riduttori prevedono oltre il fissaggio con viti, anche spine. Inserire le spine di cui i riduttori sono provvisti, nella struttura sulla quale il riduttore viene installato per una lunghezza almeno pari a 1,5 il valore del loro diametro.

## 16.0 INSTALLATION

Observing a few rules for correct installation is essential to the reliable and proper operation of the gearbox or gear motor.

The rules set out here are intended as a preliminary guide to selecting gearbox or gear motor. For effective and proper installation, follow the instructions given in the Installation, use and maintenance manual for the gearboxes of series 300 available from our Sales Organization.

Following is a brief outline of installation rules:

### a) Fastening:

- Place gearbox on a surface providing adequate rigidity. Mating surfaces should be machined and flat.
- Mating surfaces must be within definite geometric tolerances (see manual). This is especially true of flange-mounted gearboxes with splined hollow shafts.
- In applications that involve high radial loads at the output end, flange mounting is recommended for some gearbox sizes as this mounting makes use of the double pilot diameters provided on these gearboxes. See section "Loads on shafts" for the different gearbox sizes.
- Make sure the gearbox is suitable for the required mounting position (check with table A8 on page 24).
- Use screws of resistance class 8.8 and over to secure the gearbox. Torque up screws to the figures indicated in the relevant tables.  
With transmitted output torque greater than or equal to 70% of the indicated  $M_{2max}$  torque, and with frequent movement reversals, use screws with minimum resistance 10.9.  
Some gearbox sizes can be fastened using either screws or pins. If a pin is used, the length of pin seated in the frame the gearbox is being installed to should be at least 1.5 times pin diameter.

## 16.0 INSTALLATION

Im Hinblick auf die Zuverlässigkeit und eine gute Betriebsweise des Getriebes oder des Getriebemotors ist es besonders wichtig, für deren korrekten Einbau Kenntnis über einige Richtlinien zu haben.

Die hier in Folge angeführten Normen sind eine erste Anleitung für die Auswahl des Getriebes oder des Getriebemotors.

Um eine effektive und korrekt erfolgte Installation zu erhalten, muß man sich an das Anleitungs- und Instandhaltungshandbuch der Getriebe der Serie 300 halten. Dieses Handbuch ist bei unserer Verkaufsorganisation erhältlich.

Wir möchten Ihnen hier nur kurz die zu befolgenden Normen anführen:

### a) Befestigung:

- Das Getriebe auf einer ausreichend starken Stuktur mit flachen und mittels Werkzeugmaschinen bearbeiteten Passungsflächen ablegen.
- Die Passungsflächen, besonders für die mit Flansch und Keilabtriebswellen montierten Getriebe, müssen innerhalb bestimmter geometrischer Toleranzen liegen (siehe Handbuch).
- Bei einigen Baugrößen, bei Applikationen mit hoher auf dem Abtrieb einwirkender Radialkraft, wird die Montageweise mit Flansch empfohlen, wodurch die doppelten Zentrierdurchmesser, mit denen die Getriebe ausgestattet sind, verwendet werden können. Im Bezug auf die unterschiedlichen Baugrößen der Getriebe, siehe Abschnitt "Auf Wellen einwirkende Kräfte".
- Unter Bezugnahme auf die Tabelle (A8) prüfen auf Seite 24, ob das Getriebe auch für die erforderliche Montagestellung geeignet ist.
- Das Getriebe mit Schrauben der Widerstandsklasse 8.8 oder einer höheren Klasse befestigen, dabei auf die in den jeweiligen Tabellen angegebenen Anzugsmomente bringen. Für zu übertragene Maximaldrehmomente, die höher als 70% des angegebenen Werts  $M_{2max}$  oder diesem Prozentsatz gleich kommen und im Fall von häufigen Schaltungen sind Schnecken aus der Klasse der min. Widerstandsgrads 10.9 zu verwenden.  
Einige Getriebebaugrößen sehen ausser der Befestigung durch die Schrauben, auch Stifte vor. Dazu die Stifte, mit denen die Getriebe ausgestattet sind, über eine Länge von mindestens gleich 1,5 des Werts ihres Durchmesser, in die Stuktur einstecken, auf die das Getriebe installiert werden soll.

## 16.0 INSTALLATION

Il est très important pour la fiabilité et le bon fonctionnement du réducteur ou motoréducteur, de respecter certaines règles pour son installation correcte.

Les règles indiquées n'ont qu'une valeur indicative orientative pour le choix du réducteur ou motoréducteur. Pour effectuer la parfaite installation définitive, respecter les consignes d'installation, utilisation et entretien des réducteurs de la série 300, qui peuvent être livrées par notre Organisation de Vente.

Voici brièvement les règles qu'il faut suivre:

### a) Fixation:

- Faire en sorte que le réducteur repose sur un bâti suffisamment rigide avec des surfaces d'accouplement planes et usinées à la machine-outil.
- Les surfaces d'accouplement, spécialement pour les réducteurs avec bride d'assemblage et arbres de sortie femelle cannelés, doivent respecter des tolérances géométriques bien précises (voir catalogue).
- Pour certaines tailles de réducteur, dans des applications avec des charges radiales élevées à la sortie, on préconise un montage avec bride, afin d'utiliser le doubles diamètres de centrage, dont ces réducteurs sont pourvus. Se reporter à la section "Charges sur les arbres" pour les différentes tailles de réducteurs.
- Veiller à ce que le réducteur convienne à la position de montage nécessaire, ainsi qu'au tableau (A8) à la page 24, le montre.
- Fixer le réducteur avec des vis d'un degré de résistance 8.8 ou supérieur en les serrant aux valeurs de couple de serrage indiquées sur les tableaux correspondants.  
Pour des couples maximaux transmis plus importants ou équivalents à 70% du couple  $M_{2max}$  indiqué, et en cas d'inversions fréquentes du mouvement, utiliser des vis dans une classe minimale de résistance 10.9.  
Certaines tailles de réducteurs prévoient une fixation tant par vis que par goupilles. Introduire les goupilles, livrées avec les réducteurs, dans le bâti sur lequel le réducteur sera installé pour une longueur au moins égale à 1,5 de la valeur de leur diamètre.

## b) Collegamenti

- Fissare gli organi di collegamento in entrata ed uscita al riduttore evitando di battere con martello o equivalenti. Utilizzare per l'inserimento degli organi viti di servizio e i fori filettati presenti negli alberi. Prima di montare gli organi di collegamento avere cura di pulire gli alberi eliminando grassi o protettivi eventualmente presenti.

- Montaggio motori idraulici. Avere cura nel montaggio dell'O-ring di tenuta fra flangia motore e flangia in ingresso riduttore. Montare il motore idraulico prima di mettere l'olio lubrificante nel riduttore.

- Collegamento freno idraulico. Utilizzare un circuito idraulico che assicuri l'apertura del freno immediatamente prima della partenza del motoriduttore e la chiusura dopo che questo sia arrestato. Verificare che durante le fasi di motoriduttore fermo la pressione nella linea idraulica di apertura freno sia zero.

- Versi di rotazione. Nei collegamenti dei motori al circuito elettrico o idraulico in funzione dei loro versi di rotazione, tenere presente che tutti i riduttori, sia in esecuzione in linea che angolare hanno versi di rotazione concordi fra entrata e uscita. Per altre indicazioni relative ai collegamenti di motori elettrici e idraulici vedi le parti specifiche su questo catalogo pag. 191.

## c) Verniciatura

- Utilizzare vernici compatibili con la vernice di fondo presente sui riduttori, vedi condizioni di fornitura pag. 21. Durante la verniciatura proteggere gli anelli di tenuta presente sugli alberi. La vernice li può fare essiccare causando perdite d'olio.

## d) Lubrificazione

- Prima della messa in funzione riempire il riduttore d'olio lubrificante del tipo raccomandato (vedi lubrificazione a pag. 25) fino al raggiungimento del previsto livello verificabile dall'apposito tappo o livello visivo di cui ogni riduttore è provvisto in relazione alla posizione di montaggio stabilita.

## b) Connections

- Secure the connection parts to gearbox input and output. Do not tap them with hammers or similar tools. To insert these parts, use the service screws and threaded holes provided on the shafts. Be sure to clean off any grease or protectants from the shafts before fitting any connection parts.

- Fitting hydraulic motors. Be careful of the O ring between motor flange and gearbox input flange when assembling. Install the hydraulic motor before filling lube oil into the gearbox.

- Connecting the hydraulic brake. The hydraulic circuit should be such to ensure that brake is released instantly before gearbox starts and applied after gearbox has stopped. Check that pressure in the hydraulic line for brake release is at zero whenever gearbox is stopped.

- Direction of rotation. Motors are connected to the suitable electric or hydraulic circuit according to their direction of rotation. When performing these connections, bear in mind that all gearboxes, whether in the in-line or right angle design, have the same direction of rotation both at input and output. For more details of the connection of electric and hydraulic motors, see relevant sections in this catalogue on page 191.

## c) Painting

- Use paints compatible with the primer applied to the gearbox, see supply conditions on page 21. Before painting, protect the seal rings installed on the shafts. Contact with paint may deteriorate the seals with subsequent oil leakage.

## d) Lubrication

- Before start-up, fill the gearbox with the recommended lube oil (see lubrication on page 25) up to correct level. Level is checked through the suitable plug or sight glass provided on each gearbox depending on designated mounting position.

## b) Anschlüsse

- Die Anschlußteile zum Getriebeantrieb und -abtrieb befestigen, dabei ein Einklopfen mittels Hammer oder ähnlichen Gegenständen vermeiden. Beim Einführen der Teile sind Service-schrauben und die auf den Wellen vorhandenen Gewindebohrungen zu verwenden. Vor dem Montieren der Verbindungsteile müssen die Wellen durch eine entsprechende Reinigung von Fett und eventuell vorhandenen Schutzmitteln befreit werden.

- Montage der Hydraulikmotore. Der Montage des O-Dichtrings zwischen dem Motorflansch und dem Antriebsflansch am Getriebe muß besondere Aufmerksamkeit zugewendet werden. Vor dem Einfüllen des Schmieröls in das Getriebe, ist der Motor zu montieren.

- Anschluß der hydraulischen Bremse. Hierbei ist ein Hydraulikkreislauf zu verwenden, der eine unmittelbare Öffnung der Bremse, noch vor dem Anlauf des Getriebemotors und nach dessen Halt, eine Schließung sichern kann. Es ist zu überprüfen, daß während der Phasen, in denen der Getriebemotor stillsteht, der Druck in der hydraulischen Leitung für die Bremsöffnungs-funktion gleich Null ist.

- Drehrichtungen. Die Drehrichtung an der Abtriebswelle ist bei allen Getrieben, sowohl bei linear als auch bei Winkelgetrieben, gleich mit der Eingangs-drehrichtung des Hydro-oder Elektromotors. Im Bezug auf weitere Anleitungen für die Anschlüsse von Elektro- und Hydraulikmotoren, verweisen wir auf die entsprechenden Abschnitte in diesem Katalog. Siehe dazu Seite 191.

## c) Lackierung

- Es müssen Lackarten verwendet werden, die mit der bereits am Getriebe verwendeten Grundierung kompatibel sind. Siehe dazu auch die Seite 21 angeführten Lieferbedingungen. Während des Lackiervorgangs sind die auf der Welle angeordneten Dichtringe in angemessener Weise zu schützen. Der Lack kann zum Austrocknen dieser Ringe führen, was letztendlich zu Ölverlusten führen würde.

## d) Schmierung

- Vor der Inbetriebnahme muß das Getriebe solange mit dem empfohlenen Schmieröl (siehe "Schmierung" auf Seite 25) gefüllt werden, bis der vorgesehene Ölpegel erreicht wurde. Dieser Pegel ist über den entsprechenden Verschluss oder über das Schaugauge, über welches jedes Getriebe je nach festgelegten Montagetstellung verfügt, feststellbar.

## b) Raccordements

- Fixer les éléments de raccordement en entrée et en sortie du réducteur. N'utilisez pas de marteaux, ni d'outils afin de frapper. Pour l'introduction des organes, utiliser les vis correspondantes et les trous taraudés existant sur les arbres. Avant le montage des éléments de raccordement, prendre soin de nettoyer les arbres, en éliminant, si besoin est, les graisses ou agents protecteurs.

- Montage des moteurs hydrauliques. Prendre soin de monter le joint torique entre la bride moteur et la bride à l'entrée du réducteur. Installer le moteur hydraulique avant de mettre l'huile lubrifiant dans le réducteur.

- Utiliser un circuit hydraulique assurant une ouverture du frein juste avant le démarrage du motoréducteur et une fermeture après sa mise à l'arrêt. Veiller à ce que, lors des phases d'arrêt du motoréducteur, le circuit hydraulique d'ouverture frein soit totalement dépressurisé.

- Sens de rotation. Lors d'un raccordement de moteurs au circuit électrique ou hydraulique, en fonction de leurs sens de rotation, il faut tenir compte que tous les réducteurs, en exécution alignée aussi bien qu'angulaire, aient des sens de rotation concordants en entrée et en sortie. Pour d'autres indications concernant les raccordements des moteurs électriques et hydrauliques, voir les sections s'y rattachant de ce catalogue à la page 191.

## c) Peinture

- Utiliser des peintures compatibles avec la couche de fond déjà existant sur les réducteurs, se reporter aux conditions de livraison à la page 21. En cours de peinture, protéger les bagues à lèvres des arbres. La peinture peut les sécher trop et des fuites d'huile peuvent en découler.

## d) Lubrification

- Avant la mise en service, remplir le réducteur avec l'huile lubrifiante conseillée (voir lubrification à la page 25) jusqu'à atteindre le niveau prévu par rapport à la position de montage établie vérifier à travers le bouchon, ou niveau visible, dont chaque réducteur est équipé.

## 17.0 MANUTENZIONE

Controllare il serraggio dei bulloni dopo 50 ore di lavoro.

Effettuare il primo cambio olio circa dopo 100 – 150 ore di lavoro. Successivamente effettuare il cambio ogni 2000 – 3000 ore a seconda degli impieghi o almeno una volta all'anno.

È buona norma comunque controllare il livello una volta al mese per funzionamento intermittente o più frequentemente per funzionamento in continuo e aggiungere olio se necessario.

## 17.0 MAINTENANCE

Check the tightness of mounting bolts after the initial 50 hours of operation.

Change the oil first after 100 – 150 hours operation.

Subsequently, change the oil every 2000 – 3000 hours operation depending on application.

Alternatively change oil once a year.

Check the oil level in the gearbox every month and top up as necessary.

## 17.0 WARTUNG

Schrauben nach 50 Betriebsstunden auf festen Sitz prüfen.

Ersten Ölwechsel nach zirka 100 – 150 Betriebsstunden durchführen. Anschließend alle 2000 - 3000 oder mindestens einmal jährlich einen Ölwechsel durchführen (je nach Einsatzbereich).

Es sollte jedoch bei Aussetzbetrieb einmal monatlich und bei Dauerbetrieb häufiger der Ölstand kontrolliert werden. Falls notwendig, Öl nachfüllen.

## 17.0 ENTRETIEN

Controler le serrage des vis et boulons, après 50 heures de travail.

Effectuer la première vidange du lubrifiant, après 100 – 150 heures de travail. Ultérieurement, effectuer une vidange toutes les 2000 – 3000 heures, selon les applications, ou au minimum une fois par an.

Toutefois, il est conseillé de contrôler le niveau d'huile une fois par mois, en cas de fonctionnement intermittent, plus souvent en cas de service continu, et de faire l'appoint si nécessaire.

## 18.0 STOCCAGGIO

Il corretto stoccaggio dei prodotti ricevuti richiede l'esecuzione delle seguenti attività:

a) Escludere aree all'aperto, zone esposte alle intemperie o con eccessiva umidità.

b) Interporre sempre tra il pavimento ed i prodotti, pianali lignei o di altra natura, atti ad impedire il diretto contatto col suolo.

c) Per periodi di stoccaggio superiori ai 60 giorni, le superfici interessate agli accoppiamenti quali flange, alberi e giunti, devono essere protette con idoneo prodotto antiossidante (Mobilarma 248 od equivalente).

d) Per periodi di stoccaggio previsti superiori ai 6 mesi, i prodotti devono essere oggetto delle seguenti attività:

d1) Ricoprire le parti lavorate esterne e quelle di accoppiamento con grasso atto ad evitare ossidazioni.

d2) Posizionare i riduttori con il tappo di sfiato nella posizione più alta e riempirli di olio. I riduttori, prima del loro utilizzo, dovranno essere riempiti con la corretta quantità e tipo di lubrificante previsto.

## 18.0 STORAGE

Observe the following instructions to ensure correct storage of delivered products:

a) Do not store outdoors, in areas exposed to weather or with excessive humidity.

b) Always place boards in wood or other material between floor and products, to avoid direct contact with the floor.

c) For storage periods of over 60 days, all machined surfaces such as flanges, shafts and couplings must be protected with a suitable anti-oxidation product (Mobilarma 248 or equivalent product).

d) The following measures must be taken in respect of products for which the expected storage period exceeds 6 months:

d1) Cover outer machined parts and mating parts with grease to avoid oxidation.

d2) Position the gearboxes with the breather plug up and fill them with oil. Before use, the gearboxes should be filled with the proper amount of lubricant of the recommended type.

## 18.0 LAGERUNG

Die korrekte Lagerung der Antriebe erfordert folgende Vorkehrungen:

a) Die Produkte nicht im Freien lagern und nicht in Räumen, die der Witterung ausgesetzt sind, oder eine hohe Feuchtigkeit aufweisen.

b) Die Produkte nie direkt auf dem Boden, sondern auf Unterlagen aus Holz oder einem anderen Material lagern.

c) Bei Lagerzeiten von mehr als 60 Tagen die Oberflächen für die Verbindung, wie Flansche, Wellen oder Kupplungen mit einem geeigneten Oxidations-schutzmittel behandeln (Mobilarma 248 oder ein äquivalentes Mittel).

d) Bei Lagerzeiten von mehr als 6 Monaten müssen folgende Vorkehrungen getroffen werden:

d1) Die bearbeiteten Außenteile und die Passflächen mit Oxidationsschutzfett abdecken.

d2) Die Getriebe mit der Entlüftungsschraube in die oberste Position ausgerichtet montieren, dann mit Öl auffüllen. Die Getriebe müssen vor ihrem Einsatz mit der richtigen Menge des vorgesehenen Schmiermittels aufgefüllt werden.

## 18.0 STOCKAGE

Un stockage correct des produits reçus nécessite de respecter les règles suivantes:

a) Exclure les zones à ciel ouvert, les zones exposées aux intempéries ou avec humidité excessive.

b) Interposer dans tous les cas entre le plancher et les produits des planches de bois ou des supports d'autre nature empêchant le contact direct avec le sol.

c) Pour les périodes de stockage supérieures à 60 jours, les surfaces concernées par les liaisons telles que les brides, les arbres et les accouplements doivent être protégées avec un produit antioxydant spécial (Mobilarma 248 ou équivalent).

d) Pour les périodes de stockage prévues supérieures à 6 mois, les produits doivent être objet des contrôles suivants:

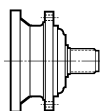
d1) Recouvrir les parties extérieures usinées et les éléments d'accouplement avec de la graisse contre l'oxydation.

d2) Positionner les réducteurs avec le bouchon reniflard le plus haut possible et les remplir d'huile. Avant utilisation, les réducteurs doivent être remplis de la quantité et du type de lubrifiant préconisés.

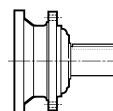
| 19.0 <b>CONDIZIONI DI FORNITURA</b>                                                                                                                                                                              | 19.0 <b>SUPPLY CONDITIONS</b>                                                                                                                                                  | 19.0 <b>LIEFERBEDINGUNGEN</b>                                                                                                                                                                                      | 19.0 <b>CONDITIONS DE LIVRAISON</b>                                                                                                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I riduttori vengono forniti come segue:                                                                                                                                                                          | Gearboxes are supplied as follows:                                                                                                                                             | Die Getriebe werden wie folgt geliefert:                                                                                                                                                                           | Les réducteurs sont livrés comme suit:                                                                                                                                                                                               |
| a) già predisposti per essere installati nella posizione di montaggio come definito in fase di ordine;                                                                                                           | a) ready for installation in the mounting position specified on order;                                                                                                         | a) bereits für die Installation in der Einbaulage gemäß Auftrag bereit;                                                                                                                                            | a) déjà adaptés pour l'installation dans la position d'assemblage définie en cours de commande;                                                                                                                                      |
| b) <b>senza olio lubrificante ed internamente protetti con un film d'olio usato per il collaudo finale;</b>                                                                                                      | b) <b>dry; inner parts are protected by a film of the oil used for final testing;</b>                                                                                          | b) <b>ohne Schmieröl und innen mit einem Öl, das für die Endabnahmeprüfung verwendet wurde, überzogen;</b>                                                                                                         | b) <b>sans huile lubrifiante et protégés à l'intérieur avec un film d'huile utilisée lors de l'essai final;</b>                                                                                                                      |
| c) verniciati con vernice di fondo antiossidante all'acqua di colore grigio (tipo Idrayon Primer-Ral 7042/C441). Le superfici di accoppiamento non sono verniciate. La verniciatura finale è a cura del cliente; | c) painted with antioxidant water primer in the colour grey (type Idrayon Primer-Ral 7042/C441). Mating surfaces are not painted. Final coat is to be applied by the Customer; | c) mit einer grauen, vor Oxydation durch Wasser schützenden Grundlackierung überzogen (Typ Idrayon Primer Ral 7042/C441). Die Verbindungsflächen sind nicht lackiert. Die Endlackierung geht zu Lasten des Kunden; | c) peints avec une couche de fond de protection antioxydant à l'eau, de coloris gris (type idrayon Primer-Ral 7042/C441). Les surfaces d'accouplement ne sont pas peintes. La peinture de finition doit être réalisée par le client; |
| d) collaudati secondo specifiche interne;                                                                                                                                                                        | d) tested to in-house specifications;                                                                                                                                          | d) gemäß werksinterner Spezifikationen geprüft.;                                                                                                                                                                   | d) essayés d'après les spécifications internes;                                                                                                                                                                                      |
| e) appositamente imballati;                                                                                                                                                                                      | e) suitably packed;                                                                                                                                                            | e) in angemessener Weise verpackt;                                                                                                                                                                                 | e) dûment emballés;                                                                                                                                                                                                                  |
| f) provvisti di dadi e bulloni per montaggio motori elettrici versione IEC o motori idraulici.                                                                                                                   | f) complete with mounting nuts and bolts for IEC electric motors or hydraulic motors.                                                                                          | f) mit Muttern und Schrauben für die Montage an Elektromotoren der Version IEC oder Hydromotoren ausgestattet.                                                                                                     | f) pourvus d'écrous et de boulons pour l'assemblage aux moteurs électriques, version CEI, ou moteurs hydrauliques.                                                                                                                   |

**3 11 L 2 16.7 HZ**

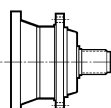
VERSIONE USCITA / OUTPUT VERSION / AUSGANGSVERSION / VERSION EN SORTIE



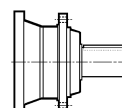
**MZ** : Albero maschio scanalato  
Splined male shaft  
Vielkeilwelle  
Arbre de sortie cannelé sortant



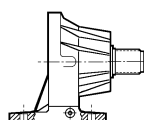
**MC** : Albero maschio cilindrico  
Solid keyed shaft  
Zylindrisches Welle  
Arbre de sortie cyl. Claveté sortant



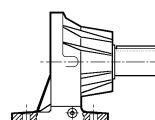
**HZ** : Albero maschio rinforzato scanalato  
Heavy duty splined male shaft  
Vielkeilwelle mit Verstärker Lagerung  
Arbres de sortie cannelé sortant, paliers renforcés



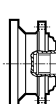
**HC** : Albero maschio rinforzato cilindrico  
Heavy duty solid keyed shaft  
Zylindrisches Welle mit Verstärker Lagerung  
Arbre de sortie cyl. claveté sortant, paliers renforcés



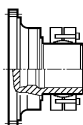
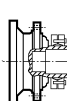
**PZ** : Base di supporto con albero maschio scanalato  
Foot mounted with splined shaft  
Fußausführung mit Keilwelle  
Base de support avec arbre mâle cannelé



**PC** : Base di supporto con albero cilindrico  
Foot mounted with solid keyed shaft  
Fußausführung mit zylindrischer Welle  
Base support à pattes avec arbre cyl. clavéte



**FZ** : Albero femmina scanalato  
Hollow splined shaft  
Vielkeilhohlwelle  
Arbre de sortie creux cannelé



**FP** : Albero femmina per giunto ad attrito  
Hollow shaft for shrink disc  
Zylindrische Hohlwelle für Schumpfscheibe  
Arbre de sortie creux pour montage par frette

RAPPORTO DI RIDUZIONE / REDUCTION RATIO / ÜBERSETZUNG / RAPPORT DE REDUCTION

Indicare il valore del rapporto (compresi punto e decimali) riportato su pagine dati tecnici

Fill in the value of the transm. ratio (including point and decimals) reported in the selection charts

Den auf den Seiten der technischen Daten angegebenen Wert des Übersetzungs (einschließlich Punkt und Dezimalen) angeben

Indiquer la valeur du rapport (y inclus les chiffres décimaux) citée aux pages des données techniques

Esim. / Ex. / Beispiel / Ex. : 1/5.33 = 5.33 1/44.6 = 44.6 1/131 = 131

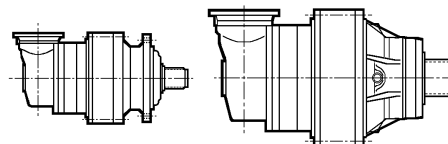
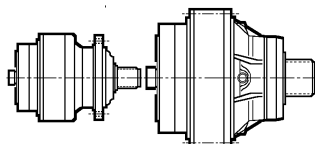
N. STADI DI RIDUZIONE / Nbr. OF REDUCTIONS / ANZAHL DER UNTERSETZ. / NOMBRE DE TRAINS

1 - 2 - 3 - 4

ESECUZIONE / DESIGN / AUSFÜHRUNG / EXECUTION

L = Lineare / In line / Linear / Coaxiale

R = Angolare / Right angle / Rechtwinklig / A renvoi d'angle



GRANDEZZA RIDUTTORE / GEARBOX SIZE / GETRIEBEBAUGRÖSSE / TAILLE REDUCTEUR

00 = 300  
01 = 301  
03 = 303  
05 = 305

30  
40  
50  
60

06 = 306  
07 = 307  
09 = 309  
10 = 310

70  
80  
90  
100

11 = 311  
13 = 313  
15 = 315  
16 = 316

110  
120  
130  
140

17 = 317  
18 = 318  
19 = 319  
21 = 321

150  
160  
170  
180

SERIE / SERIES / SERIE / SERIE

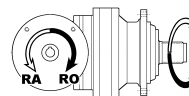
20.0 DESIGNAZIONE /  
RIDUTTORE20.0 GEARBOX  
DESIGNATION20.0 GETRIEBE-  
BEZEICHNUNG20.0 DESIGNATION  
REDUCTEUR**6A S5EC A A W0A ... ..**OPZIONI / OPTIONS  
OPTIONEN / OPTIONSGUARNIZIONI / GASKET / DICHTUNGEN / MATIERE ETANCHE  
STANDARD=NITRILBUTADIENE / NITRILBUTADIENE  
NITRILBUTADIEN / NITRILEBUTADIENE

PV = VITON

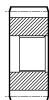
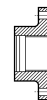
SOLO PER ESECUZIONE ANGOLARE / ONLY FOR RIGHT ANGLE DESIGN  
NUR FÜR WINKELAUSFÜHRUNGEN / UNIQUEMENT EN CASE D'EXECUTION D'ANGLE  
senso di rotazione in ingresso preferenziale / preferential input direction of rotation  
bevorzugte umdrehungsrichtung am antrieb / sensé de rotation de preference en entrée

RA = sinistro / Left / Links / Gauche

RO = destro / Right / Rechts / Droit

CENTRALINA AUSILIARE DI RAFFREDDAMENTO  
SUPPLEMENTARY COOLING SYSTEM  
HILFSKÜHLSYSTEM  
UNITE' DE REFROIDISSEMENT AUXILIAIRECR1  
CR2  
CR3

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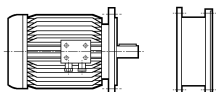
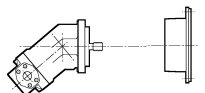
ACCESSORI IN USCITA / OUTPUT FITTINGS  
ZUBEHÖR (ABTRIEB) / ACCESSOIRES COTE SORTIEP... = Pignoni  
Pinions  
Ritzel  
PignonsB0A = Barra scanalata  
Splinedbar  
Vielkeilvollwelle  
Barre canneléeM0A = Manicotto liscio  
Sleeve coupling  
Nabe  
Manchon lisseG0A = Giunto ad attrito  
Shrink disc  
Schrumpfscheibe  
Frette de serrageW0A = Flangia  
Flange  
Flansch  
BrideORIENTAMENTO FLANGIA MOTORE / MOTOR FLANGE ORIENTATION  
ORIENTERUNG DER MOTORFLANSCH / ORIENTATION DE LA BRIDE MOTEUR

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POS. DI MONTAGGIO / MOUNTING POS.  
EINBAULAGEN / POS. DE MONTAGE

24

ENTRATA / INPUT / EINGANG / ENTREE

Albero veloce  
Input keyed shaft  
Eingangswelle  
Arbre d'entrée cyl. clavetéPredisposizione motore elettrico  
Electric motor connection  
Motoranbauteile für IEC-Motor  
Adaptation pour moteur électriquePredisposizione motore idraulico  
Hydraulic Motor connection  
Motoranbauteile für Hydromotor  
Adaptation pour moteur hydrauliqueMotoriduttore con motore idraulico integrato orbitale MG  
Hydraulic motor MG  
Hydraulikmotor MG  
Moteur hydraulique MGVO1A = Ø 24  
VO1B = Ø 38  
VO5B = Ø 48  
VO6B = Ø 60  
VO7B = Ø 80  
V11 B = Ø 80P + grandezza motore (80,90,100,132,160,...)  
P + motor size (80,90,100,132,160,...)  
P + Motor Größe (80,90,100,132,160,...)  
P + tailles de moteur (80,90,100,132,160,...)

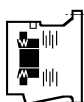
215

S5AP, COAA, HOBA, .....

191

T4AA

201

SOLO CON IN ENTRATA MOTORE IDRAULICO / ONLY WITH HYDRAULIC MOTOR ADAPTOR  
NUR AM HYDRAULIKMOTORANTRIEB / UNIQUEMENT AVEC ENTREE MOTEUR HYDRAULIQUEFreno idraulico negativo a dischi multipli standard / Standard negative multidisc brake  
Standard negative lamellenbremse / Frein multidisque negatif standard

6 = Grandezza / Type / Typ / Type : 4 - 5 - 6

A = Jarrumomentti - Braking torque - Bremsmoment - Couple de frenage : A - B - C

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Freno idraulico negativo a dischi multipli per motore orbitale  
Negative multidisc brake for MG hydraulic motor  
Negative lamellenbremse für Hydraulikmotor MG  
Frein multidisque negatif pour moteur hydraulique MG

SF = Senza freno / Without brake / Ohne Bremse / Sans frein

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## 21.0 POSIZIONI DI MONTAGGIO

Per la completa definizione della forma costruttiva del motoriduttore o del riduttore selezionato, definire la posizione di montaggio rispetto al suolo secondo la tabella (A8) e l'orientamento dell'angolare.

## 21.0 MOUNTING POSITION

For a proper designation of the geared motor or gearbox, mounting position please refer to the table (A8) to determine mounting position and right angle unit arrangement.

## 21.0 MONTAGEPOSITIONEN

Für die vollständige Definition der Bauform des Getriebemotors oder des gewählten Getriebes ist die Montagestellung gegenüber dem Boden gemäß der Tabelle (A8) und der Ausrichtung des Winkelstücks festzulegen.

## 21.0 POSITION DE FONCTIONNEMENT

Pour une définition complète de la forme de construction, du motoréducteur ou réducteur sélectionné, préciser la position de montage par rapport au sol, d'après les tableaux (A8) et l'orientation de coude.

(A8)

| Riduttori in linea                                                                        | In-line units                                                                             | Coaxiale Untersetzungsgetriebe                                                            | Réducteurs coaxiaux                                                                       |
|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <p><b>A</b></p> <p><b>O</b></p>                                                           | <p><b>E</b></p> <p><b>Q</b></p>                                                           | <p><b>F</b></p> <p><b>T</b></p>                                                           | <p><b>G</b></p> <p><b>V</b></p>                                                           |
| Riduttori angolari                                                                        | Right angle units                                                                         | Rechtwinklige Untersetzungsgetriebe                                                       | Réducteurs a renvoi d'angle                                                               |
| <p><b>B</b></p> <p><b>B0, B1, B2, B3</b></p> <p><b>P</b></p> <p><b>P0, P1, P2, P3</b></p> | <p><b>I</b></p> <p><b>I0, I1, I2, I3</b></p> <p><b>R</b></p> <p><b>R0, R1, R2, R3</b></p> | <p><b>J</b></p> <p><b>J0, J1, J2, J3</b></p> <p><b>U</b></p> <p><b>U0, U1, U2, U3</b></p> | <p><b>M</b></p> <p><b>M0, M1, M2, M3</b></p> <p><b>W</b></p> <p><b>W0, W1, W2, W3</b></p> |

## 22.0 LUBRIFICAZIONE (prima della messa in funzione)

Tutti i riduttori prevedono una lubrificazione a bagno d'olio. Nelle posizioni di montaggio che prevedono i riduttori con un asse verticale, dove lo sbattimento dell'olio durante il funzionamento non sarebbe sufficiente a garantire la corretta lubrificazione dei cuscinetti superiori, vengono adottati adeguati sistemi di lubrificazione. Prima della messa in opera im-

## 22.0 LUBRICATION (prior to start-up)

All gearboxes are oil-bath lubricated. For applications calling for gearboxes with a vertically positioned axis, in which oil coverage during operation would not be sufficient to ensure correct lubrication of upper bearings, suitable life lubrication systems are used. Before start-up, fill the gearbox with the correct quantity of oil, selecting the viscosity level as per

## 22.0 SCHMIERUNG (vor der Inbetriebnahme)

Alle Getriebe weisen eine Ölbad-schmierung auf. Werden die Getrie-be mit vertikaler Achse eingebaut, so daß nicht gewährleistet werden kann, daß das Öl während des Betriebs des Getriebes auch die oberen Lager ordnungsgemäß schmiert, werden entsprechende Dauerschmierungen vorgesehen. Vor der Inbetriebnahme muß die entsprechende Schmiermittelmengen einge-

## 22.0 LUBRIFICATION (avant mise en route)

Tous réducteurs prévoient une lubrification en bain d'huile. Dans les positions de montage qui prévoient les réducteurs avec axe vertical, où le barbotage de l'huile pendant le fonctionnement serait insuffisant pour garantir une lubrification correcte des paliers supérieurs, l'on adopte des systèmes appropriés de graissage à vie. Avant la mise en service, intro-

mettere la giusta quantità di lubrificante scegliendo la viscosità nella tabella (A9). A tal proposito i riduttori sono muniti dei tappi di carico, livello e scarico olio.

Al fine di predisporre il corretto orientamento dei tappi, per una adeguata lubrificazione, chiediamo di precisare sempre la posizione di montaggio desiderata.

Nella tabella (A9) sono riportate le marche più diffuse di lubrificante con i tipi di oli consigliati per applicazioni normali.

– Per funzionamenti particolari dove sono richiesti speciali requisiti, interpellare il nostro servizio tecnico.

– La temperatura max. del lubrificante in esercizio continuo non deve superare gli 85°C.

– Tutti i riduttori vengono forniti senz'olio, ma predisposti con tappi di carico, scarico e livello.

– La quantità d'olio indicata per i vari tipi di riduttori sono indicative, il riempimento esatto deve essere fatto controllando il livello.

– Nel caso in cui la potenza trasmessa superi quella termica, occorrerà una circolazione d'olio (vedi cap.45 a pag. 220).

table (A9). These gearboxes are provided with oil filling, level and drain plugs.

For a proper plug positioning for adequate lubrication, please always specify the required mounting position.

The table (A9) lists the most common brands of lubricant and the types recommended for normal applications.

– Note: For applications with special operating conditions, consult the factory with complete information.

– Oil temperature must not exceed 85°C.

– Units are delivered without oil but with filling, draining and oil level plugs correctly positioned.

– The oil capacities indicated for the various types of unit are indicative only. Check the oil level plug to ensure the correct amount of oil.

– Should transmitted power exceed the thermal capacity of the unit forced lubrication must be provided (see chap.45 at page 220).

füllt werden. Die hierzu jeweils erforderlichen Viskositätswerte können der Tabelle (A9) entnommen werden. Für diesen Füllvorgang wurden die Getriebe mit Verschlüssen für das Einfüllen, Nachfüllen und den Ablass des Öls ausgestattet.

Um die Verschlüsse für eine angemessene Schmierung in korrekter Weise auszurichten zu können, empfehlen wir Ihnen, immer die gewünschte Montageposition anzugeben.

In der Tabelle (A9) sind die bekanntesten Marken von Schmiermitteln mit den empfohlenen Ölen für normale angeführt Einsatz.

– Im Falle von speziellen Einsatzbereichen, bei denen besondere Anforderungen vorliegen sind, wenden Sie sich bitte an unsere technische Abteilung.

– Die maximale Temperatur des Schmiermittels bei Dauerbetrieb darf 85°C nicht überschreiten.

– Sämtliche Untersetzungsgetriebe werden ohne Öl geliefert, sind und mit einer Ölfüll-Ölablaß- und Ölstandschraube versehen.

– Die für die verschiedenen Typen von Untersetzungsgetrieben angegebenen Füllmengen sind Richtwerte. Die Befüllung erfolgt über die Kontrolle des Ölstandes.

– Sollte die übertragene Leistung die thermische Leistung übersteigen, so wird eine Ölumläng-zung erforderlich (Siehe Abschnitt 45, Seite 220).

duire la quantité exacte de lubrifiant choisissant la viscosité du tableau (A9). Les réducteurs sont pourvus à cet effet de bouchon de remplissage, jauge de niveau et élément de vidange huile.

Dans le but de réaliser une mise en place exacte des bouchons, pour une lubrification appropriée, il est conseillé de spécifier toujours la position de montage souhaitée.

Sur le tableau (A9), ont été reportées les marques les plus répandues de lubrifiants avec les types conseillés, pour des applications normales.

– Pour des applications dans des conditions de fonctionnement particulières, consulter nos Services Techniques.

– La température maxi du lubrifiant, en fonctionnement continu, ne doit pas dépasser 85°C.

– Tous les réducteurs sont livrés sans huile, mais équipés de bouchons de remplissage, de vidange, et de niveau.

– Les quantités d'huile, précisées pour les divers types de réducteurs, sont indicatives, le remplissage exact devant être effectué en contrôlant le niveau.

– Dans le cas où la puissance transmise dépasserait la puissance thermique, il sera nécessaire de prévoir une circulation d'huile (voir par.45 à page 220).

(A9)

|                                                                                           | IMPIANTI INDUSTRIALI / INDUSTRIAL PLANTS<br>INDUSTRIEANLAGEN/ INSTALLATIONS INDUSTRIELLES                                                    |                        |                                       | MACCHINE MOBILI / MOBILE MACHINES<br>BEWEGLICHE MASCHINEN / MACHINES MOBILES                                                                                  |                            |
|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
|                                                                                           | norme ISO .. con caratteristiche EP. - ISO standard .. E.P. grade<br>ISO-Normen .. E.P.-Merkmalen - normes ISO .. avec caractéristiques E.P. |                        |                                       | norme SAE .. con caratteristiche API GL5 - SAE standard .. API GL5 grade<br>SAE-Normen .. mit API GL5-Merkmalen - normes SAE .. avec caractéristiques API GL5 |                            |
| Temperatura ambiente<br>Ambient temperature<br>Temperaturbereiche<br>Température ambiante | -10°C / +30°C                                                                                                                                | +10°C / +45°C          | -20°C / +60°C                         | -20°C / +30°C                                                                                                                                                 | +10°C / +45°C              |
|                                                                                           | <b>ISO VG 150</b>                                                                                                                            | <b>ISO VG 220</b>      | <b>ISO VG 150-220</b>                 | <b>SAE 80W/90</b>                                                                                                                                             | <b>SAE 85W/140</b>         |
| <b>AGIP</b>                                                                               | BLASIA150                                                                                                                                    | BLASIA 220             | BLASIA S220                           | ROTRA MP                                                                                                                                                      | ROTRA MP                   |
| <b>ARAL</b>                                                                               | DEGOL BG 150                                                                                                                                 | DEGOL BG 220           | DEGOL GS 220                          | GETRIEBEOL HYP                                                                                                                                                | GETRIEBEOL HYP             |
| <b>BP-MACH</b>                                                                            | ENERGOL GR XP 150                                                                                                                            | ENERGOL GR XP 220      | ENERSYN HTX 220                       | HYPOGEAR EP                                                                                                                                                   | HYPOGEAR EP                |
| <b>CASTROL</b>                                                                            | ALPHA SP 150                                                                                                                                 | ALPHA SP 220           | ALPHASYN PG 150                       | HYPOY                                                                                                                                                         | HYPOY                      |
| <b>CHEVRON</b>                                                                            | N.L. GEAR COMPOUND 150                                                                                                                       | N.L. GEAR COMPOUND 220 |                                       | UNIVERSAL GEAR LUBRICANTE                                                                                                                                     | UNIVERSAL GEAR LUBRICANTE  |
| <b>ELF</b>                                                                                | REDUCTELF SP150                                                                                                                              | REDUCTELF SP 220       | ELF ORITIS 125 MS<br>ELF SYNTERMA P20 | TRANSELF8                                                                                                                                                     | TRANSELF8                  |
| <b>ESSO</b>                                                                               | SPARTAN EP 150                                                                                                                               | SPARTAN EP 220         | GLYCOLUBE 220                         | GEAR OIL GX<br>PONTONIC MP                                                                                                                                    | GEAR OIL GX<br>PONTONIC MP |
| <b>FINA</b>                                                                               | GIRAN 150                                                                                                                                    | GIRAN 220              |                                       |                                                                                                                                                               |                            |
| <b>I.P.</b>                                                                               | MELLANA150                                                                                                                                   | MELLANA220             | TELESIA OIL 150                       | PONTIAX HD                                                                                                                                                    | PONTIAX HD                 |
| <b>KLUBER</b>                                                                             | KLUBEROIL GEM1-150                                                                                                                           | KLUBEROIL GEM1-320     | KLUBERSYNT GH 6-220                   |                                                                                                                                                               |                            |
| <b>Q8</b>                                                                                 | GOYA 150                                                                                                                                     | GOYA 220               | EL GRECO 220                          |                                                                                                                                                               |                            |
| <b>MOBIL</b>                                                                              | MOBILGEAR 629                                                                                                                                | MOBILGEAR 630          | SHC 630                               | MOBILUBE HD                                                                                                                                                   | MOBILUBE HD                |
| <b>SHELL</b>                                                                              | OMALA EP150                                                                                                                                  | OMALA EP220            | TIVELA OIL SA                         | SPIRAXHD                                                                                                                                                      | SPIRAX HD                  |
| <b>TOTAL</b>                                                                              | CARTER EP 150                                                                                                                                | CARTER EP 220          |                                       | TRANSMISSION TM                                                                                                                                               | TRANSMISSION TM            |

■ Oli a base sintetica

■ Synthetic oil

■ Synthetische Öle

■ Huiles à base synthétique

#### LUBRIFICAZIONE FRENI

I freni idraulici a dischi multipli hanno lubrificazione unica con il riduttore.

#### BRAKES LUBRICATION

The hydraulically operated multidisc brakes are lubricated by the same oil as the gearbox.

#### BREMSE SCHMIERUNG

Die hydraulischen Lamellenbremsen werden über die Schmierung des Untersetzungsgetriebes geschmiert.

#### FREINS LUBRIFICATION

Les freins hydrauliques à disques multiples sont lubrifié avec la même huile que les réducteurs.

22.1 Posizione tappi olio

22.1 Plug positions

22.1 Position der Schrauben

22.1 Positions des bouchons

(A10)

- TUTTI I RIDUTTORI**  
1 Tappo carico e sfiato  
2 Tappo di livello  
3 Tappo scarico  
4 Comando freno

- RIDUTTORI LINEARI AD 1 STADIO**  
1A Tappo carico e sfiato  
3A Tappo scarico

- RIDUTTORI LINEARI A 2 STADI**  
1b Tappo carico e sfiato  
3A Tappo scarico

- ALLE GETRIEBE**  
1 Einfüll- und Ablassschraube  
2 Ölstandsschraube  
3 Ölablassschraube  
4 Bremsöffnung

- LINEAR GETRIEBE MIT 1 STUFEN**  
1A Einfüll- und Ablassschraube  
3A Ölablassschraube

- RECHTWINLIG GETRIEBE MIT 2 STUFEN**  
1B Einfüll- und Ablassschraube  
3A Ölablassschraube

- ALL GEARBOXES**  
Filling/breather oil plug  
Oil level plug  
Oil draining plug  
Brake port

- 1 STAGE INLINE GEARBOXES**  
Filling/breather oil plug  
Oil draining plug

- 2 STAGE RIGHT ANGLE GEARBOXES**  
Filling/breather oil plug  
Oil draining plug

- TOUTES REDUCTEURS**  
Bouchon de remplissage et reniflard  
Bouchon de niveau  
Bouchon de vidange  
Commande frein

- REDUCTEURS COAXIALE AVEC 1 TRAIN DE REDUCTION**  
Bouchon de remplissage et reniflard  
Bouchon de vidange

- REDUCTEURS A RENVOI D'ANGLE AVEC 2 TRAINS DE REDUCTION**  
Bouchon de remplissage et reniflard  
Bouchon de vidange

**A  
E**

**B1  
B3  
I1  
I3**

**B2  
I2**

**B0  
I0**

**300-307**

**309-321**

**300-307**

**309-321**

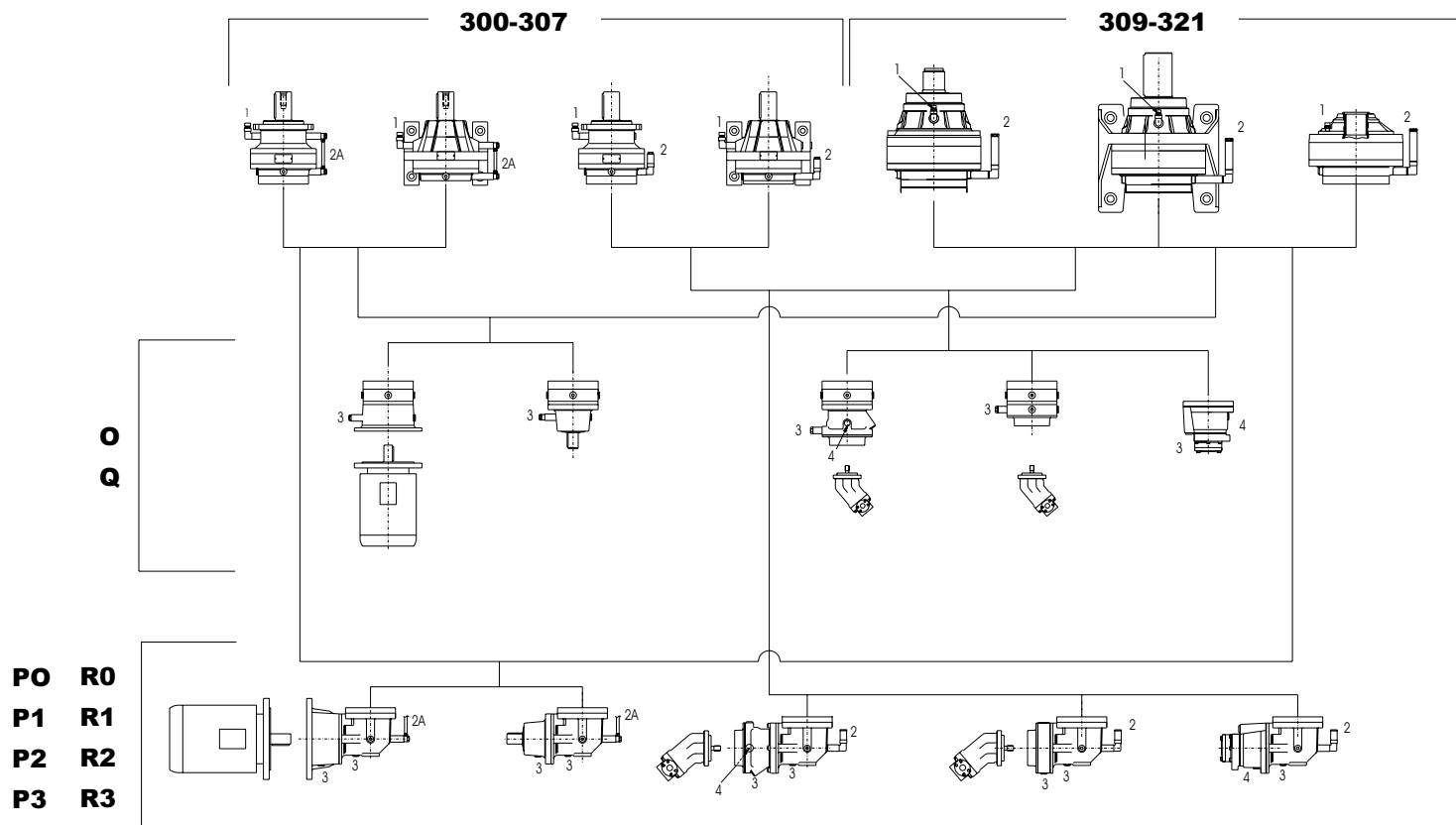
22.1 Posizione tappi olio

22.1 Plug positions

22.1 Position der Schrauben

22.1 Positions des bouchons

(A11)



**TUTTI I RIDUTTORI**

- 1 Tappo carico e sfiato
- 2 Tappo di livello
- 2A Tubo trasparente di livello
- 3 Tappo scarico
- 4 Comando freno
- 5 Vaso espansione olio per applicazioni di continuo

**ALL GEARBOXES**

- Filling/breather oil plug
- Oil level plug
- Transparent oil level hose
- Oil draining plug
- Brake port
- Oil tank, for gearboxes in industrial application

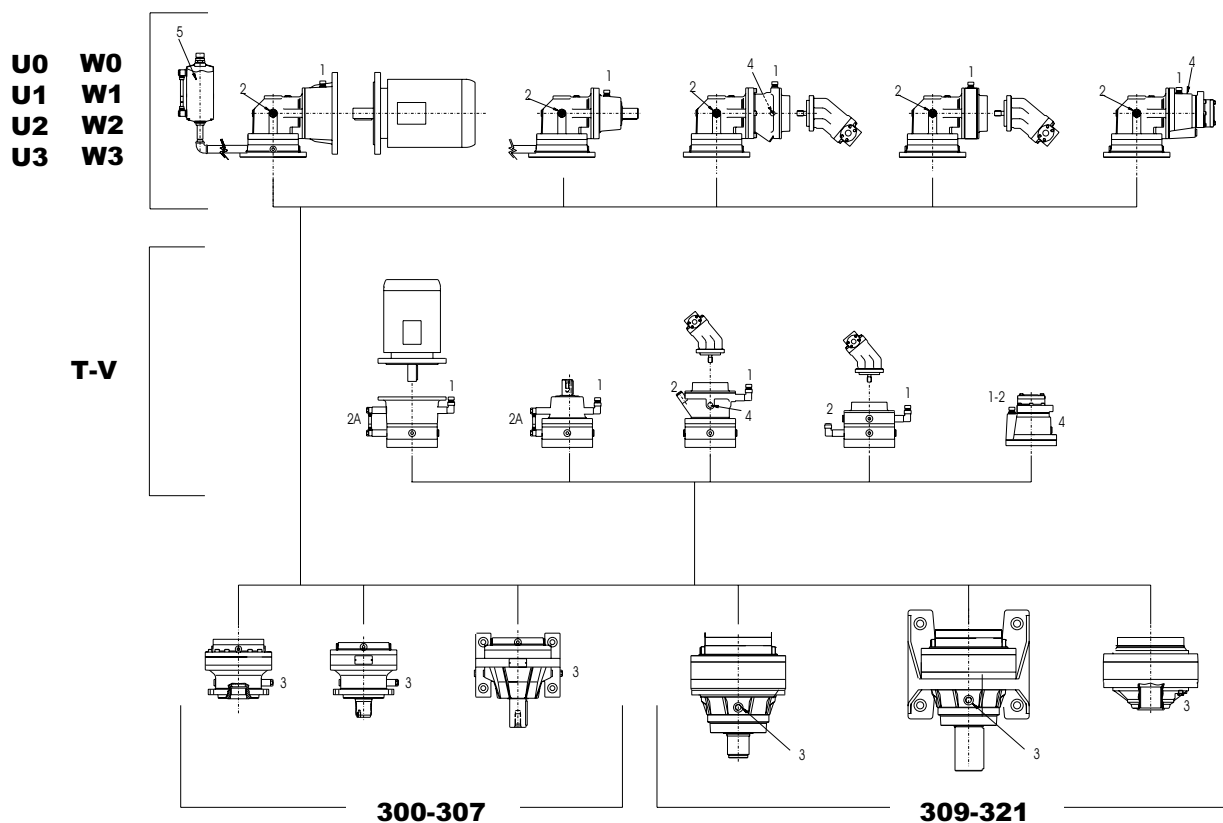
**ALLE GETRIEBE**

- Einfüll- und Ablasschraube
- Ölstandschraube
- Ölablaßschraube
- Bremsöffnung
- Ölüberlaufgefäß für Applikationen im Dauerbetriebe

**TOUTES REDUCTEURS**

- Bouchon de remplissage et reniflard
- Bouchon de niveau
- Bouchon de niveau
- Bouchon de vidange
- Commande frein
- Vase d'expansion pour des applications en service continu

(A12)



## 22.2 Quantità olio (I)

## 22.2 Oil quantity (I)

## 22.2 Schmierolmenge (I)

## 22.2 Quantité d'huile

(A13)

| Tipo/Type<br>Typ/Type |    |  <div>                     Posizione di montaggio<br/>                     Mounting position<br/>                     Einbaulagen<br/>                     Position de montage                 </div> <div>24</div> |      |      | Tipo/Type<br>Typ/Type |    |  <div>                     Posizione di montaggio<br/>                     Mounting position<br/>                     Einbaulagen<br/>                     Position de montage                 </div> <div>24</div> |     |     |
|-----------------------|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|-----------------------|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
|                       |    | A                                                                                                                                                                                                                                                                                                    | T    | O    |                       |    | B0                                                                                                                                                                                                                                                                                                     | U*  | P*  |
|                       |    |                                                                                                                                                                                                                                                                                                      |      |      |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
| <b>300</b>            | L1 | 0.6                                                                                                                                                                                                                                                                                                  | 1.0  | 0.9  | <b>300</b>            | R2 | 1.2                                                                                                                                                                                                                                                                                                    | 1.7 | 1.5 |
|                       | L2 | 0.9                                                                                                                                                                                                                                                                                                  | 1.3  | 1.2  |                       | R3 | 1.5                                                                                                                                                                                                                                                                                                    | 2.0 | 1.8 |
|                       | L3 | 1.2                                                                                                                                                                                                                                                                                                  | 1.6  | 1.5  |                       | R4 | 1.8                                                                                                                                                                                                                                                                                                    | 2.3 | 2.1 |
|                       | L4 | 1.5                                                                                                                                                                                                                                                                                                  | 1.9  | 1.8  |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
| <b>301</b>            | L1 | 0.8                                                                                                                                                                                                                                                                                                  | 1.2  | 1.1  | <b>301</b>            | R2 | 1.6                                                                                                                                                                                                                                                                                                    | 2.1 | 1.9 |
|                       | L2 | 1.1                                                                                                                                                                                                                                                                                                  | 1.5  | 1.4  |                       | R3 | 1.9                                                                                                                                                                                                                                                                                                    | 2.4 | 2.2 |
|                       | L3 | 1.4                                                                                                                                                                                                                                                                                                  | 1.8  | 1.7  |                       | R4 | 2.2                                                                                                                                                                                                                                                                                                    | 2.7 | 2.5 |
|                       | L4 | 1.7                                                                                                                                                                                                                                                                                                  | 2.1  | 2.0  |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
| <b>303</b>            | L1 | 1.3                                                                                                                                                                                                                                                                                                  | 2.3  | 2.0  | <b>303</b>            | R2 | 2.2                                                                                                                                                                                                                                                                                                    | 2.8 | 2.6 |
|                       | L2 | 1.6                                                                                                                                                                                                                                                                                                  | 2.6  | 2.3  |                       | R3 | 2.5                                                                                                                                                                                                                                                                                                    | 3.1 | 2.9 |
|                       | L3 | 1.9                                                                                                                                                                                                                                                                                                  | 2.9  | 2.6  |                       | R4 | 2.8                                                                                                                                                                                                                                                                                                    | 3.4 | 3.2 |
|                       | L4 | 2.2                                                                                                                                                                                                                                                                                                  | 3.2  | 2.9  |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
| <b>305</b>            | L1 | 1.6                                                                                                                                                                                                                                                                                                  | 2.6  | 2.4  | <b>305</b>            | R2 | 2.5                                                                                                                                                                                                                                                                                                    | 3.1 | 2.9 |
|                       | L2 | 2.1                                                                                                                                                                                                                                                                                                  | 3.1  | 2.9  |                       | R3 | 3.0                                                                                                                                                                                                                                                                                                    | 3.6 | 3.4 |
|                       | L3 | 2.4                                                                                                                                                                                                                                                                                                  | 3.4  | 3.2  |                       | R4 | 3.3                                                                                                                                                                                                                                                                                                    | 3.9 | 3.7 |
|                       | L4 | 2.7                                                                                                                                                                                                                                                                                                  | 3.7  | 3.5  |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
| <b>306</b>            | L1 | 2.5                                                                                                                                                                                                                                                                                                  | 3.5  | 3.2  | <b>306</b>            | R2 | 4.0                                                                                                                                                                                                                                                                                                    | 5.0 | 4.8 |
|                       | L2 | 3.3                                                                                                                                                                                                                                                                                                  | 4.3  | 4.0  |                       | R3 | 4.8                                                                                                                                                                                                                                                                                                    | 5.8 | 5.6 |
|                       | L3 | 3.6                                                                                                                                                                                                                                                                                                  | 4.6  | 4.3  |                       | R4 | 5.1                                                                                                                                                                                                                                                                                                    | 6.1 | 5.9 |
|                       | L4 | 3.9                                                                                                                                                                                                                                                                                                  | 4.9  | 4.6  |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
| <b>307</b>            | L1 | 3.5                                                                                                                                                                                                                                                                                                  | 5.0  | 4.5  | <b>307</b>            | R2 | 6.0                                                                                                                                                                                                                                                                                                    | 8.0 | 7.0 |
|                       | L2 | 4.5                                                                                                                                                                                                                                                                                                  | 6.0  | 5.5  |                       | R3 | 7.0                                                                                                                                                                                                                                                                                                    | 9.0 | 8.0 |
|                       | L3 | 5.0                                                                                                                                                                                                                                                                                                  | 6.5  | 6.0  |                       | R4 | 7.5                                                                                                                                                                                                                                                                                                    | 9.5 | 8.5 |
|                       | L4 | 5.3                                                                                                                                                                                                                                                                                                  | 6.8  | 6.3  |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
| <b>309</b>            | L1 | 4.0                                                                                                                                                                                                                                                                                                  | 5.5  | 5.0  | <b>309</b>            | R2 | 6.5                                                                                                                                                                                                                                                                                                    | 8.5 | 7.5 |
|                       | L2 | 5.0                                                                                                                                                                                                                                                                                                  | 6.5  | 6.0  |                       | R3 | 7.5                                                                                                                                                                                                                                                                                                    | 9.5 | 8.5 |
|                       | L3 | 5.5                                                                                                                                                                                                                                                                                                  | 7.0  | 6.5  |                       | R4 | 8.0                                                                                                                                                                                                                                                                                                    | 10  | 9   |
|                       | L4 | 5.8                                                                                                                                                                                                                                                                                                  | 7.3  | 6.8  |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
| <b>310</b>            | L1 | 5.0                                                                                                                                                                                                                                                                                                  | 6.5  | 6.0  | <b>310</b>            | R3 | 11                                                                                                                                                                                                                                                                                                     | 13  | 12  |
|                       | L2 | 6.3                                                                                                                                                                                                                                                                                                  | 7.8  | 7.3  |                       | R4 | 12                                                                                                                                                                                                                                                                                                     | 14  | 13  |
|                       | L3 | 7.1                                                                                                                                                                                                                                                                                                  | 8.6  | 8.1  |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
|                       | L4 | 7.4                                                                                                                                                                                                                                                                                                  | 8.9  | 8.4  |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
| <b>311</b>            | L1 | 7.0                                                                                                                                                                                                                                                                                                  | 12   | 10   | <b>311</b>            | R2 | 14                                                                                                                                                                                                                                                                                                     | 19  | 17  |
|                       | L2 | 9.0                                                                                                                                                                                                                                                                                                  | 14   | 12   |                       | R3 | 16                                                                                                                                                                                                                                                                                                     | 21  | 19  |
|                       | L3 | 10                                                                                                                                                                                                                                                                                                   | 15   | 13   |                       | R4 | 17                                                                                                                                                                                                                                                                                                     | 22  | 20  |
|                       | L4 | 10.5                                                                                                                                                                                                                                                                                                 | 15.5 | 13.5 |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
| <b>313</b>            | L1 | 9.0                                                                                                                                                                                                                                                                                                  | 14   | 12   | <b>313</b>            | R2 | 16                                                                                                                                                                                                                                                                                                     | 21  | 19  |
|                       | L2 | 11.5                                                                                                                                                                                                                                                                                                 | 16.5 | 14.5 |                       | R3 | 19                                                                                                                                                                                                                                                                                                     | 24  | 22  |
|                       | L3 | 12.5                                                                                                                                                                                                                                                                                                 | 17.5 | 15.5 |                       | R4 | 20                                                                                                                                                                                                                                                                                                     | 25  | 23  |
|                       | L4 | 13                                                                                                                                                                                                                                                                                                   | 18   | 16   |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
| <b>315</b>            | L1 | 15                                                                                                                                                                                                                                                                                                   | 23   | 19   | <b>315</b>            | R3 | 27                                                                                                                                                                                                                                                                                                     | 35  | 31  |
|                       | L2 | 19                                                                                                                                                                                                                                                                                                   | 27   | 23   |                       | R4 | 30                                                                                                                                                                                                                                                                                                     | 38  | 34  |
|                       | L3 | 21                                                                                                                                                                                                                                                                                                   | 29   | 25   |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
|                       | L4 | 22                                                                                                                                                                                                                                                                                                   | 30   | 26   |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
| <b>316</b>            | L1 | 18                                                                                                                                                                                                                                                                                                   | 26   | 22   | <b>316</b>            | R3 | 30                                                                                                                                                                                                                                                                                                     | 38  | 34  |
|                       | L2 | 22                                                                                                                                                                                                                                                                                                   | 30   | 26   |                       | R4 | 33                                                                                                                                                                                                                                                                                                     | 41  | 37  |
|                       | L3 | 24                                                                                                                                                                                                                                                                                                   | 32   | 28   |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
|                       | L4 | 25                                                                                                                                                                                                                                                                                                   | 33   | 29   |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
| <b>317</b>            | L1 | 20                                                                                                                                                                                                                                                                                                   | 35   | 30   | <b>317</b>            | R3 | 38                                                                                                                                                                                                                                                                                                     | 52  | 48  |
|                       | L2 | 26                                                                                                                                                                                                                                                                                                   | 41   | 36   |                       | R4 | 42                                                                                                                                                                                                                                                                                                     | 56  | 52  |
|                       | L3 | 29                                                                                                                                                                                                                                                                                                   | 44   | 39   |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
|                       | L4 | 30                                                                                                                                                                                                                                                                                                   | 45   | 40   |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
| <b>318</b>            | L1 | 25                                                                                                                                                                                                                                                                                                   | 40   | 35   | <b>318</b>            | R4 | 48                                                                                                                                                                                                                                                                                                     | 63  | 58  |
|                       | L2 | 35                                                                                                                                                                                                                                                                                                   | 50   | 45   |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
|                       | L3 | 40                                                                                                                                                                                                                                                                                                   | 55   | 50   |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
|                       | L4 | 43                                                                                                                                                                                                                                                                                                   | 58   | 53   |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
| <b>319</b>            | L1 | 35                                                                                                                                                                                                                                                                                                   | 55   | 45   | <b>319</b>            |    |                                                                                                                                                                                                                                                                                                        |     |     |
|                       | L2 | 45                                                                                                                                                                                                                                                                                                   | 65   | 55   |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
|                       | L3 | 50                                                                                                                                                                                                                                                                                                   | 70   | 60   |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
|                       | L4 | 53                                                                                                                                                                                                                                                                                                   | 73   | 63   |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
| <b>321</b>            | L1 | 35                                                                                                                                                                                                                                                                                                   | 55   | 45   | <b>321</b>            |    |                                                                                                                                                                                                                                                                                                        |     |     |
|                       | L2 | 50                                                                                                                                                                                                                                                                                                   | 70   | 60   |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
|                       | L3 | 56                                                                                                                                                                                                                                                                                                   | 76   | 66   |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |
|                       | L4 | 60                                                                                                                                                                                                                                                                                                   | 80   | 70   |                       |    |                                                                                                                                                                                                                                                                                                        |     |     |

N.B. Le quantità d'olio sono indicative. Verificare l'esatto livello al momento del riempimento tramite l'apposito tappo.

N.B. Oil quantities are indicative. Check actual level after filling through the appropriate plug.

Achtung! Die Angabe bezüglich Ölmenge sind Richtwerte. Der Ölstand soll während des Einfüllens anhand des Ölstandstopfens überprüft werden.

N.B. Les quantités d'huile sont indicatives. Vérifiez la quantité correcte de lubrifiant selon le niveau d'huile.

23.0 **TABELLE DATI  
TECNICI  
RIDUTTORI E  
DIMENSIONI**

23.0 **GEARBOX SELECTION  
CHARTS AND  
DIMENSIONS**

23.0 **GETRIEBEAUSWAHL-  
TABELLEN UND  
ABMESSUNGEN**

23.0 **TABLEAUX DES  
CARACTERISTIQUES  
TECHNIQUES  
REDUCTEURS ET  
DIMENSIONS**

| GRANDEZZA / SIZE<br>BAUGRÖÖE / TAILLE | M <sub>2</sub><br>[Nm] |   |   |
|---------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 300                                   | 1 000                  | 30                                                                                                                                                                    | 31                                                                                                                                                                      |
| 301                                   | 1 750                  | 40                                                                                                                                                                    | 41                                                                                                                                                                      |
| 303                                   | 2 500                  | 50                                                                                                                                                                    | 51                                                                                                                                                                      |
| 305                                   | 5 000                  | 60                                                                                                                                                                    | 61                                                                                                                                                                      |
| 306                                   | 8 500                  | 70                                                                                                                                                                    | 71                                                                                                                                                                      |
| 307                                   | 12 500                 | 80                                                                                                                                                                    | 81                                                                                                                                                                      |
| 309                                   | 18 500                 | 90                                                                                                                                                                    | 91                                                                                                                                                                      |
| 310                                   | 25 000                 | 100                                                                                                                                                                   | 101                                                                                                                                                                     |
| 311                                   | 35 000                 | 110                                                                                                                                                                   | 111                                                                                                                                                                     |
| 313                                   | 50 000                 | 120                                                                                                                                                                   | 121                                                                                                                                                                     |
| 315                                   | 80 000                 | 130                                                                                                                                                                   | 131                                                                                                                                                                     |
| 316                                   | 105 000                | 140                                                                                                                                                                   | 141                                                                                                                                                                     |
| 317                                   | 150 000                | 150                                                                                                                                                                   | 151                                                                                                                                                                     |
| 318                                   | 200 000                | 160                                                                                                                                                                   | 161                                                                                                                                                                     |
| 319                                   | 300 000                | 170                                                                                                                                                                   | 171                                                                                                                                                                     |
| 321                                   | 450 000                | 180                                                                                                                                                                   | 181                                                                                                                                                                     |

# 300L

**M<sub>2</sub> = 1000 Nm**

|  | i     | M <sub>n2</sub> [Nm]        |                             |                             |                              |                              |                                | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|-----------------------------------------------------------------------------------|-------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                   | 1:    | n <sub>2</sub> ·h<br>10 000 | n <sub>2</sub> ·h<br>25 000 | n <sub>2</sub> ·h<br>50 000 | n <sub>2</sub> ·h<br>100 000 | n <sub>2</sub> ·h<br>500 000 | n <sub>2</sub> ·h<br>1 000 000 | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>L1</b>                                                                         | 3.48  | 700                         | 700                         | 700                         | 650                          | 650                          | 640                            | 20             | 7.5            | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 4.26  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 20             | 7.5            | 2 000                | 4 000                | 330            | 4H                                                                                  |
|                                                                                   | 5.77  | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 18.2           | 7.5            | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 7.20  | 700                         | 600                         | 550                         | 550                          | 550                          | 510                            | 12.4           | 7.5            | 2 000                | 4 000                | 160            | 4D                                                                                  |
| <b>L2</b>                                                                         | 12.1  | 700                         | 700                         | 700                         | 650                          | 650                          | 640                            | 9.0            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 14.8  | 700                         | 700                         | 700                         | 650                          | 650                          | 640                            | 7.3            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 18.2  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 7.8            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 20.1  | 700                         | 700                         | 700                         | 650                          | 650                          | 640                            | 5.4            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 24.6  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 5.8            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 30.7  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 4.9            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 33.3  | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 3.3            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 41.5  | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 2.8            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 51.8  | 700                         | 600                         | 550                         | 550                          | 550                          | 510                            | 1.9            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
| <b>L3</b>                                                                         | 42.1  | 700                         | 700                         | 700                         | 650                          | 650                          | 640                            | 2.9            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 51.6  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 3.2            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 63.2  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 2.7            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 69.9  | 700                         | 700                         | 700                         | 650                          | 650                          | 640                            | 1.7            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 77.5  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 2.2            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 85.6  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 2.0            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 105   | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 1.6            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 116   | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 1.2            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 131   | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 1.3            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 142   | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 1.2            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 177   | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 0.97           | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 192   | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 0.80           | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 221   | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 0.78           | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 240   | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 0.67           | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 299   | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 0.56           | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 373   | 700                         | 600                         | 550                         | 550                          | 550                          | 510                            | 0.38           | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
| <b>L4</b>                                                                         | 403   | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 0.63           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 447   | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 0.66           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 494   | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 0.60           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 558   | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 0.53           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 616   | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 0.48           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 755   | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 0.39           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 819   | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 0.36           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 942   | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 0.31           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 022 | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 0.29           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 108 | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 0.27           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 275 | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 0.23           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 383 | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 0.21           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 591 | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 0.19           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 725 | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 0.17           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 153 | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 0.14           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 687 | 700                         | 600                         | 550                         | 550                          | 550                          | 510                            | 0.11           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

**M<sub>2</sub> = 1000 Nm**

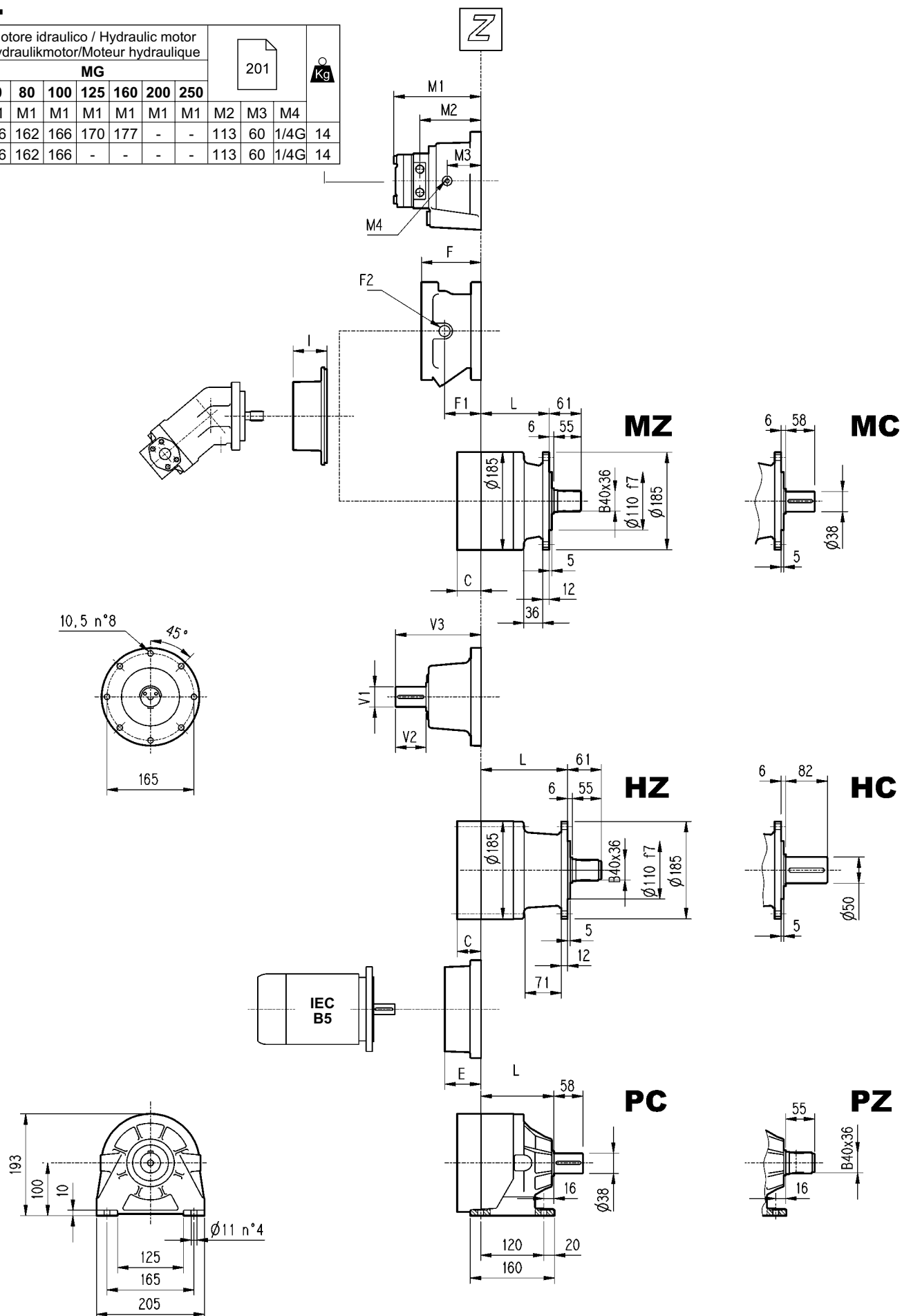
**300R**

|  | i    | M <sub>n2</sub> [Nm]        |                             |                             |                              |                              |                                | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|----------------------------------------------------------------------------------|------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                  | 1:   | n <sub>2</sub> ·h<br>10 000 | n <sub>2</sub> ·h<br>25 000 | n <sub>2</sub> ·h<br>50 000 | n <sub>2</sub> ·h<br>100 000 | n <sub>2</sub> ·h<br>500 000 | n <sub>2</sub> ·h<br>1 000 000 | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>R2</b>                                                                        | 7.13 | 700                         | 700                         | 700                         | 650                          | 650                          | 640                            | 15.0           | 12             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 8.74 | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 15.0           | 12             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 11.8 | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 9.2            | 12             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 14.8 | 700                         | 600                         | 550                         | 550                          | 550                          | 510                            | 6.2            | 12             | 2 000                | 4 000                | 100            | 4B                                                                                  |
| <b>R3</b>                                                                        | 24.8 | 700                         | 700                         | 700                         | 650                          | 650                          | 640                            | 4.7            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 30.4 | 700                         | 700                         | 700                         | 650                          | 650                          | 640                            | 4.0            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 37.3 | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 4.3            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 41.2 | 700                         | 700                         | 700                         | 650                          | 650                          | 640                            | 2.9            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 50.4 | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 3.3            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 62.9 | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 2.7            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 68.2 | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 1.9            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 85.2 | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 1.6            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 106  | 700                         | 600                         | 550                         | 550                          | 550                          | 510                            | 1.1            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
| <b>R4</b>                                                                        | 86.4 | 700                         | 700                         | 700                         | 650                          | 650                          | 640                            | 2.4            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 106  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 2.8            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 130  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 2.3            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 143  | 700                         | 700                         | 700                         | 650                          | 650                          | 640                            | 1.4            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 159  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 1.9            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 175  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 1.7            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 215  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 1.4            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 237  | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 1.1            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 268  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 1.1            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 291  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 1.0            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 363  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 0.81           | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 394  | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 0.70           | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 453  | 1 000                       | 1 000                       | 890                         | 850                          | 760                          | 610                            | 0.65           | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 491  | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 0.58           | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 613  | 860                         | 730                         | 650                         | 650                          | 650                          | 580                            | 0.48           | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 765  | 700                         | 600                         | 550                         | 550                          | 550                          | 510                            | 0.33           | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

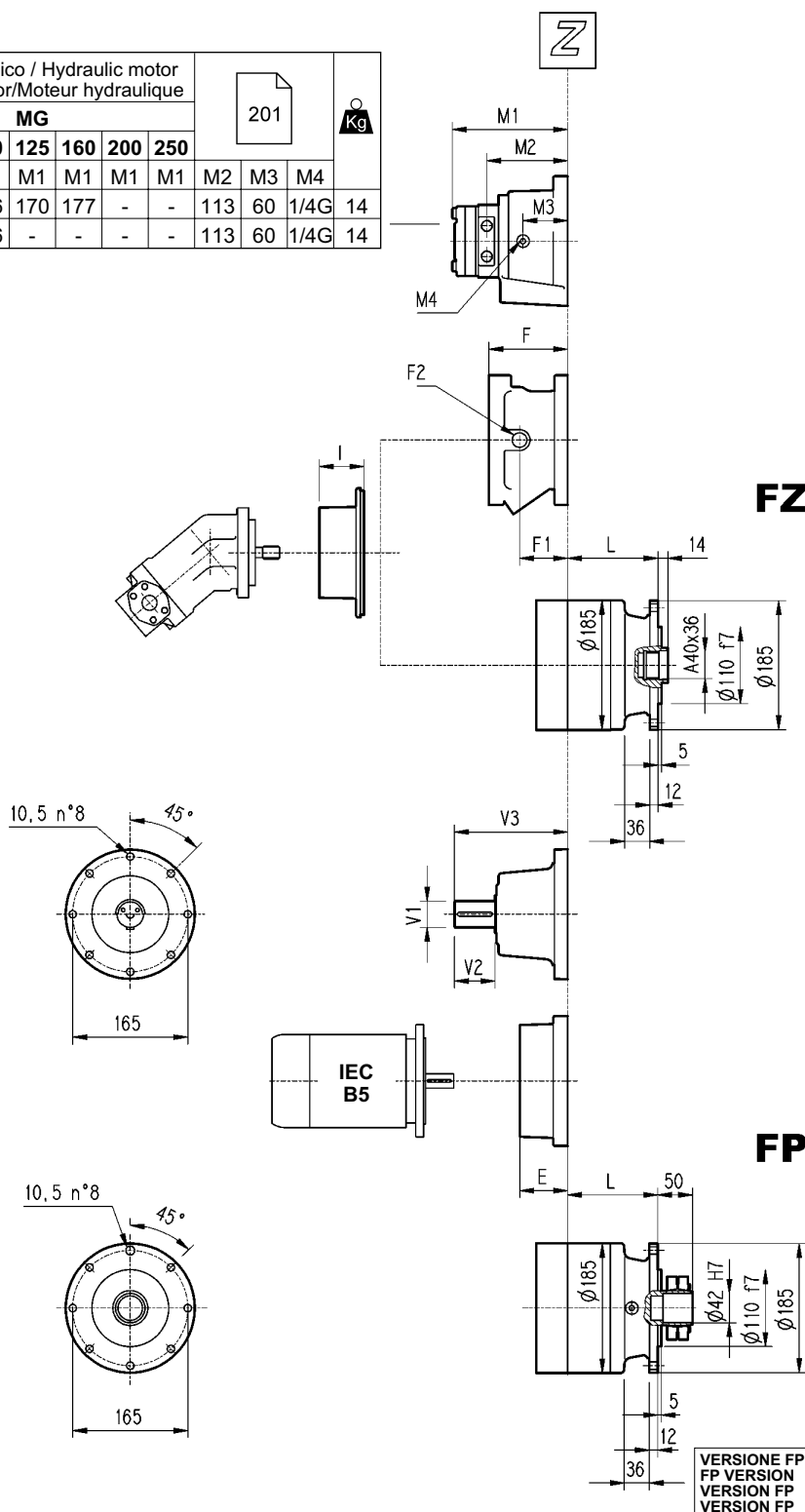
# 300.L

|                 |                                                                         |     |     |     |     |     |     |                                                                                                                                                                     |    |      |    |
|-----------------|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------|----|
|                 | Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     |   |    |      |    |
|                 | MG                                                                      |     |     |     |     |     |     |                                                                                                                                                                     |    |      |    |
| cm <sup>3</sup> | 50                                                                      | 80  | 100 | 125 | 160 | 200 | 250 |                                                                                                                                                                     |    |      |    |
|                 | M1                                                                      | M1  | M1  | M1  | M1  | M1  | M1  | M2                                                                                                                                                                  | M3 | M4   |    |
| <b>300L1</b>    | 156                                                                     | 162 | 166 | 170 | 177 | -   | -   | 113                                                                                                                                                                 | 60 | 1/4G | 14 |
| <b>300L2</b>    | 156                                                                     | 162 | 166 | -   | -   | -   | -   | 113                                                                                                                                                                 | 60 | 1/4G | 14 |



# 300L

| Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     |     |     |    |         |
|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|----|---------|
| MG                                                                      |     |     |     |     |     |     |     | 201 |    |         |
| cm <sup>3</sup>                                                         | 50  | 80  | 100 | 125 | 160 | 200 | 250 | M2  | M3 | M4      |
|                                                                         | M1  | M1  | M1  | M1  | M1  | M1  | M1  | M2  | M3 | M4      |
| <b>300L1</b>                                                            | 156 | 162 | 166 | 170 | 177 | -   | -   | 113 | 60 | 1/4G 14 |
| <b>300L2</b>                                                            | 156 | 162 | 166 | -   | -   | -   | -   | 113 | 60 | 1/4G 14 |



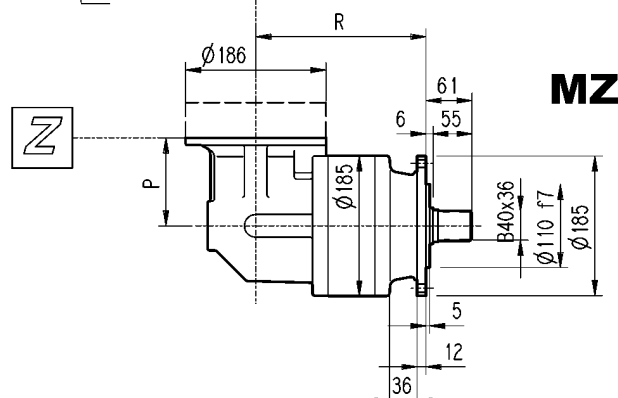
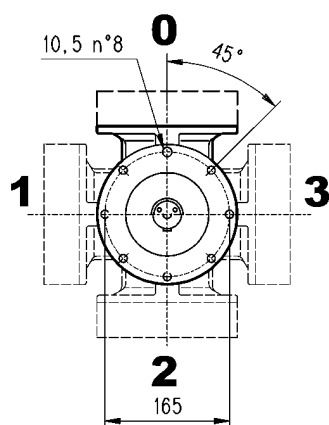
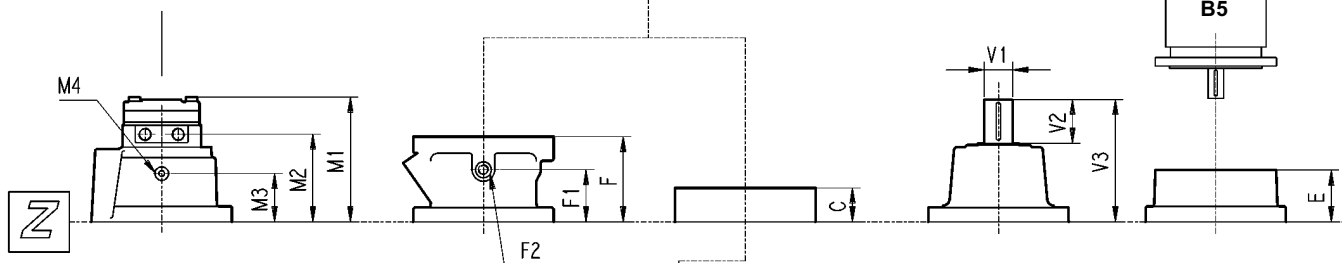
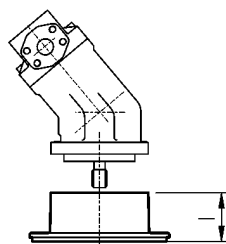
|             |                           |          |
|-------------|---------------------------|----------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 1 200 Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |          |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |          |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |          |

|               | L     |       |       |       | Kg    |       |       |       | Entrata Input Antriebs |                        |     |     | Entrata Input Antriebs |       |           |                        | Kg |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|------------------------|------------------------|-----|-----|------------------------|-------|-----------|------------------------|----|
|               | MZ MC | FZ FP | HZ HC | PC PZ | MZ MC | FZ FP | HZ HC | PC PZ | C                      | Entrata Input Antriebs | I   | F   | F1                     | F2    | Tipo Type | Entrata Input Antriebs |    |
| <b>300 L1</b> | 80    | 80    | 115   | 86    | 18    | 16    | 20    | 23    | 37                     | A                      | 191 | 105 | 65                     | 1/4 G | 4         | A                      | 10 |
| <b>300 L2</b> | 133   | 133   | 168   | 139   | 22    | 20    | 24    | 27    | 37                     | A                      |     | 105 | 65                     | 1/4 G | 4         | A                      | 10 |
| <b>300 L3</b> | 186   | 186   | 221   | 192   | 26    | 24    | 28    | 31    | 37                     | A                      |     | 105 | 65                     | 1/4 G | 4         | A                      | 10 |
| <b>300 L4</b> | 239   | 239   | 274   | 245   | 30    | 28    | 32    | 35    | 37                     | A                      |     | 105 | 65                     | 1/4 G | 4         | A                      | 10 |

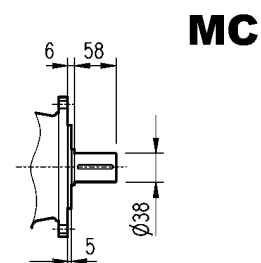
|               | V1 | V2 | V3    | Kg | V1 | V2 | V3  | Kg | E      |        |        |         |         |         |  |  |  |
|---------------|----|----|-------|----|----|----|-----|----|--------|--------|--------|---------|---------|---------|--|--|--|
|               |    |    |       |    |    |    |     |    | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 |  |  |  |
| <b>300 L1</b> | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     |  |  |  |
| <b>300 L2</b> | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     |  |  |  |
| <b>300 L3</b> | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     |  |  |  |
| <b>300 L4</b> | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     |  |  |  |

# 300R

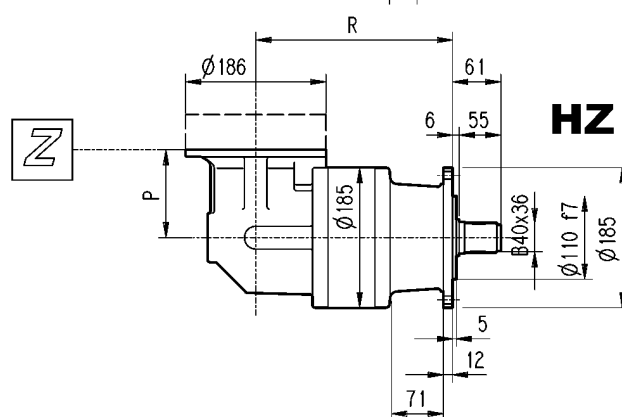
|                 | Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     | <div><br/>201</div> |    |      | <div><br/>Kg</div> |
|-----------------|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|------------------------------------------------------------------------------------------------------|----|------|-----------------------------------------------------------------------------------------------------|
|                 | MG                                                                      |     |     |     |     |     |     |                                                                                                      |    |      |                                                                                                     |
| cm <sup>3</sup> | 50                                                                      | 80  | 100 | 125 | 160 | 200 | 250 |                                                                                                      |    |      |                                                                                                     |
|                 | M1                                                                      | M1  | M1  | M1  | M1  | M1  | M1  | M2                                                                                                   | M3 | M4   |                                                                                                     |
| 300R2           | 156                                                                     | 162 | 166 | -   | -   | -   | -   | 113                                                                                                  | 60 | 1/4G | 14                                                                                                  |



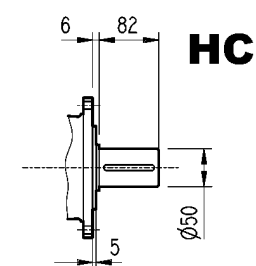
**MZ**



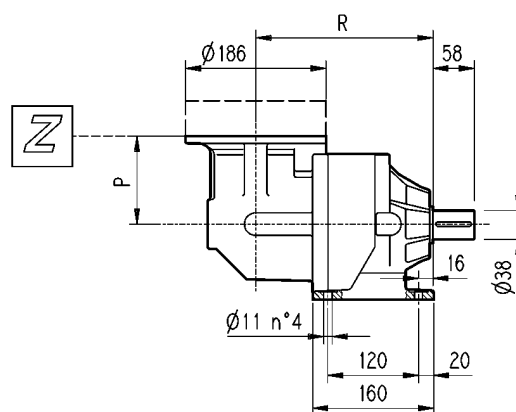
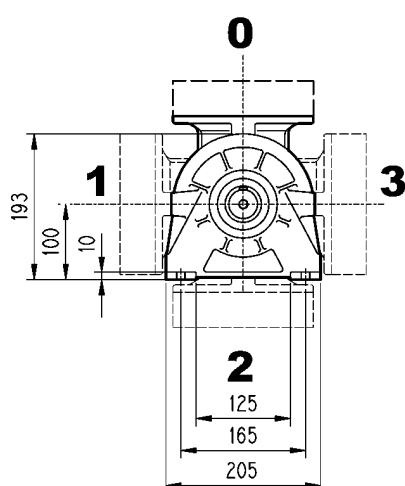
**MC**



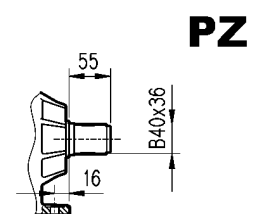
**HZ**



**HC**



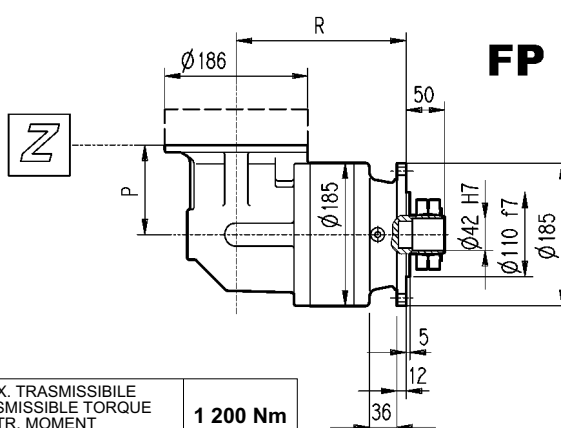
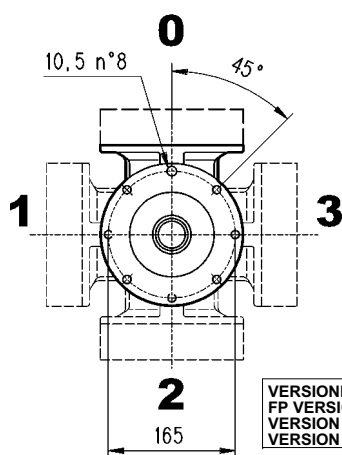
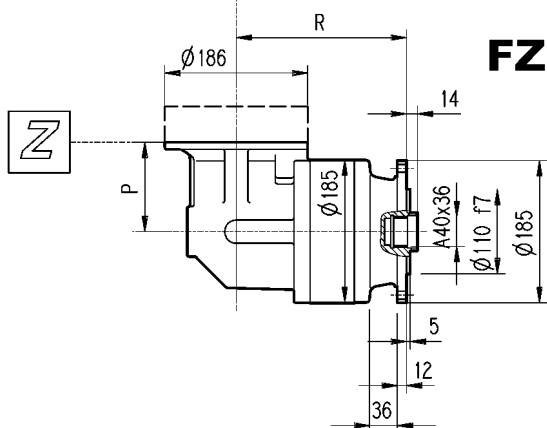
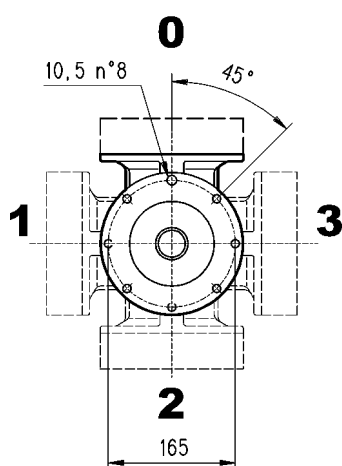
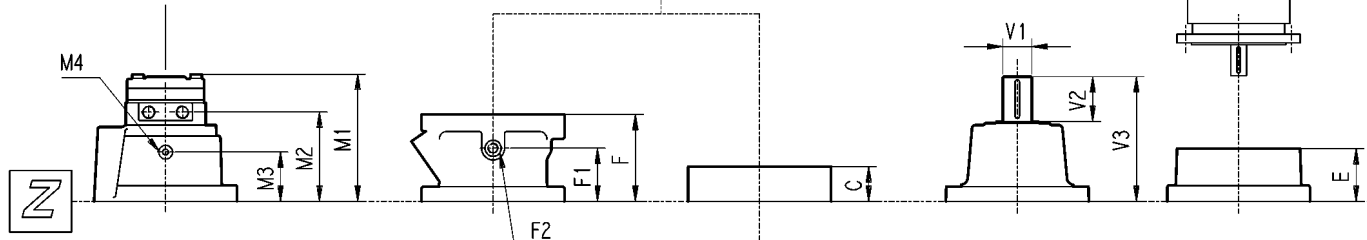
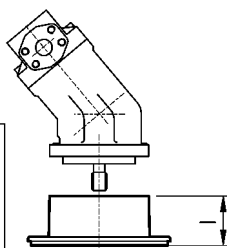
**PC**



**PZ**

# 300R

|       | Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     | <div><br/>201</div> |     |    | <div><br/>Kg</div> |     |
|-------|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|------------------------------------------------------------------------------------------------------|-----|----|-----------------------------------------------------------------------------------------------------|-----|
|       | MG                                                                      |     |     |     |     |     |     |                                                                                                      |     |    |                                                                                                     |     |
|       | cm <sup>3</sup>                                                         | 50  | 80  | 100 | 125 | 160 | 200 |                                                                                                      |     |    |                                                                                                     | 250 |
|       | M1                                                                      | M1  | M1  | M1  | M1  | M1  | M1  | M1                                                                                                   | M2  | M3 | M4                                                                                                  |     |
| 300R2 | 156                                                                     | 162 | 166 | -   | -   | -   | -   | -                                                                                                    | 113 | 60 | 1/4G                                                                                                | 14  |

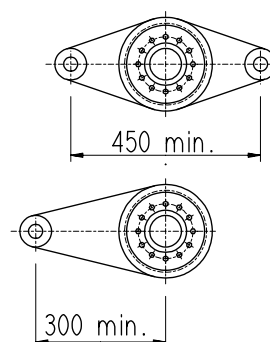
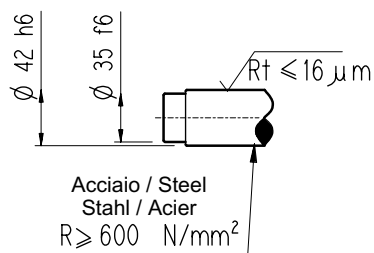
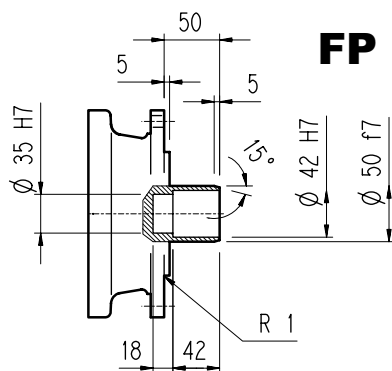
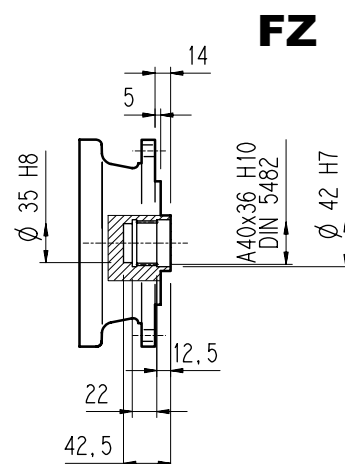
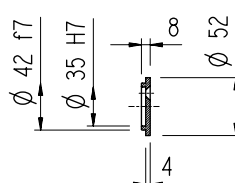
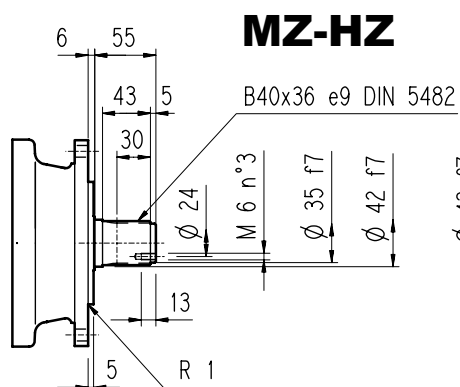
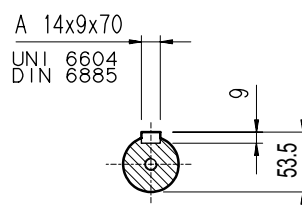
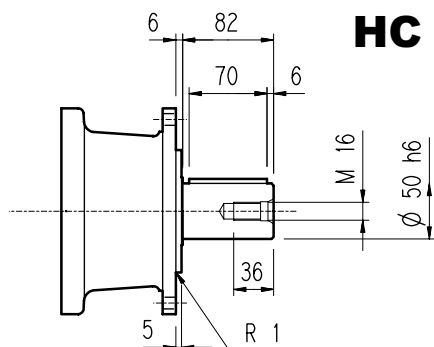
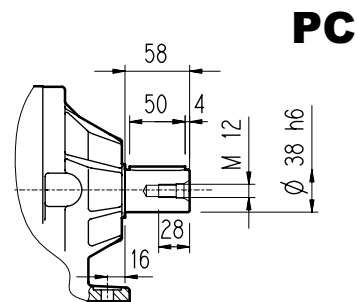
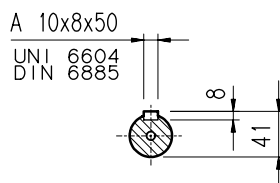
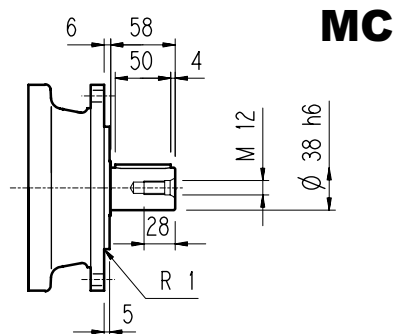


|             |                           |          |
|-------------|---------------------------|----------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 1 200 Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |          |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |          |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |          |

|        | R     |       |       |       | P   |  |       |       |       |  |                                       |  |     |  |       |                            |                                       |                                                                                       |
|--------|-------|-------|-------|-------|-----|---------------------------------------------------------------------------------------|-------|-------|-------|-------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------|-------|----------------------------|---------------------------------------|---------------------------------------------------------------------------------------|
|        | MZ MC | FZ FP | HZ HC | PC PZ |     | MZ MC                                                                                 | FZ FP | HZ HC | PC PZ | C                                                                                   | Entrata<br>Input<br>Antrieb<br>Entrée | I                                                                                   | F   | F1                                                                                  | F2    | Typ<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |  |
| 300 R2 | 172   | 172   | 207   | 178   | 122 | 32                                                                                    | 30    | 34    | 37    | 37                                                                                  | A                                     |  | 105 | 65                                                                                  | 1/4 G | 4                          | A                                     | 10                                                                                    |
| 300 R3 | 225   | 225   | 260   | 231   | 122 | 36                                                                                    | 34    | 38    | 41    | 37                                                                                  | A                                     |                                                                                     | 105 | 65                                                                                  | 1/4 G | 4                          | A                                     | 10                                                                                    |
| 300 R4 | 278   | 278   | 313   | 284   | 122 | 40                                                                                    | 38    | 42    | 45    | 37                                                                                  | A                                     |                                                                                     | 191 | 105                                                                                 | 65    | 1/4 G                      | 4                                     | A                                                                                     |

|        | V1 | V2 | V3    | Kg | V1 | V2 | V3  | Kg | E      |        |        |         |         |         |  |  |
|--------|----|----|-------|----|----|----|-----|----|--------|--------|--------|---------|---------|---------|--|--|
|        |    |    |       |    |    |    |     |    | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 |  |  |
| 300 R2 | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     |  |  |
| 300 R3 | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     |  |  |
| 300 R4 | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     |  |  |

## 300L - 300R

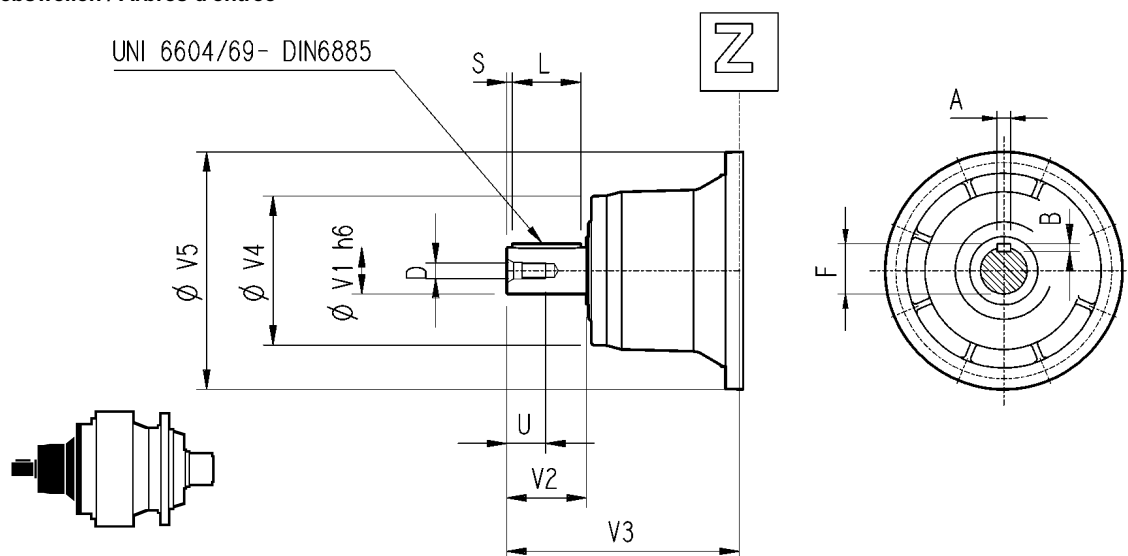


|                                                       |                                                                                                            |                 |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | <b>1 200 Nm</b> |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------|



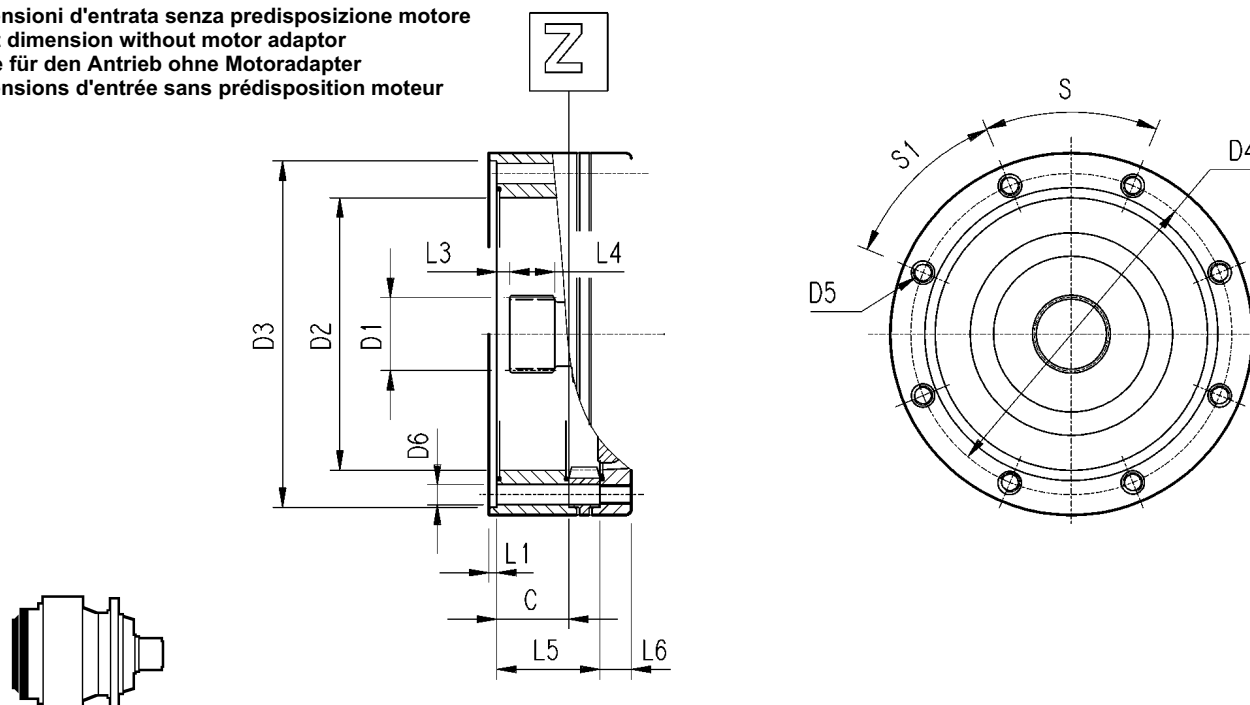
## 300L - 300R

Alberi veloci / Input shaft  
Antriebswellen / Arbres d'entrée



|              | CODE | V1 | V2 | V3    | V4  | V5  | A  | B | F  | L  | S | D   | U  |
|--------------|------|----|----|-------|-----|-----|----|---|----|----|---|-----|----|
| 300 L1       | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27 | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41 | 50 | 4 | M12 | 28 |
| 300 L2       | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27 | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41 | 50 | 4 | M12 | 28 |
| 300 L3       | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27 | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41 | 50 | 4 | M12 | 28 |
| 300 L4       | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27 | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41 | 50 | 4 | M12 | 28 |
| 300 R2-R3-R4 | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27 | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41 | 50 | 4 | M12 | 28 |

Dimensioni d'entrata senza predisposizione motore  
Input dimension without motor adaptor  
Maße für den Antrieb ohne Motoradapter  
Dimensions d'entrée sans prédisposition moteur



|              | C  | D1            | D2  | D3     | D4  | D5      | D6 | L1 | L2 | L3 | L4 | L5  | L6 | S   | S1  | Entrata<br>Input<br>Antrieb<br>Entrée |
|--------------|----|---------------|-----|--------|-----|---------|----|----|----|----|----|-----|----|-----|-----|---------------------------------------|
| 300 L1       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 53  | 18 | 45° | 45° | A                                     |
| 300 L2       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 106 | 18 | 45° | 45° | A                                     |
| 300 L3       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 159 | 18 | 45° | 45° | A                                     |
| 300 L4       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 212 | 18 | 45° | 45° | A                                     |
| 300 R2-R3-R4 | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 37  | 18 | 45° | 45° | A                                     |

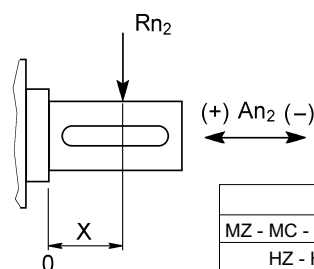
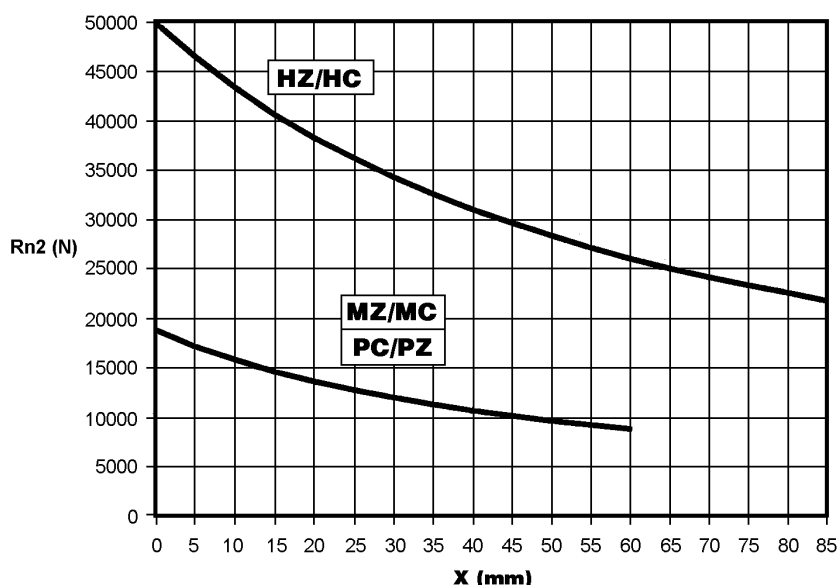
## 300L - 300R

Carichi radiali ed assiali ammissibili sull'albero lento per un valore di  $Fh_2 : n_2 \cdot h = 10\ 000$

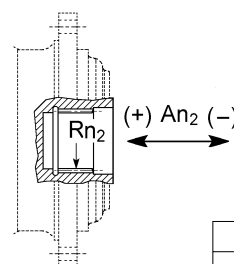
Permissible radial and axial loads on output shaft with  $Fh_2 : n_2 \cdot h = 10\ 000$

An der Ausgangswelle zulässige Radiallasten und Axialkräfte für einen Wert von  $Fh_2 : n_2 \cdot h = 10\ 000$

Charges radiales et axiales admissibles sur l'arbre lent pour une valeur de  $Fh_2 : n_2 \cdot h = 10\ 000$



|                   | An2 (+) | An2 (-) |
|-------------------|---------|---------|
| MZ - MC - PC - PZ | 20 000  | 15 000  |
| HZ - HC           | 40 000  | 40 000  |



|    | Rn2   | An2 (+/-) |
|----|-------|-----------|
| FZ | 8 000 | 8 000     |

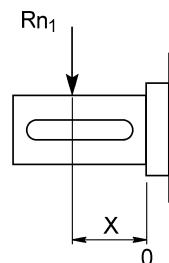
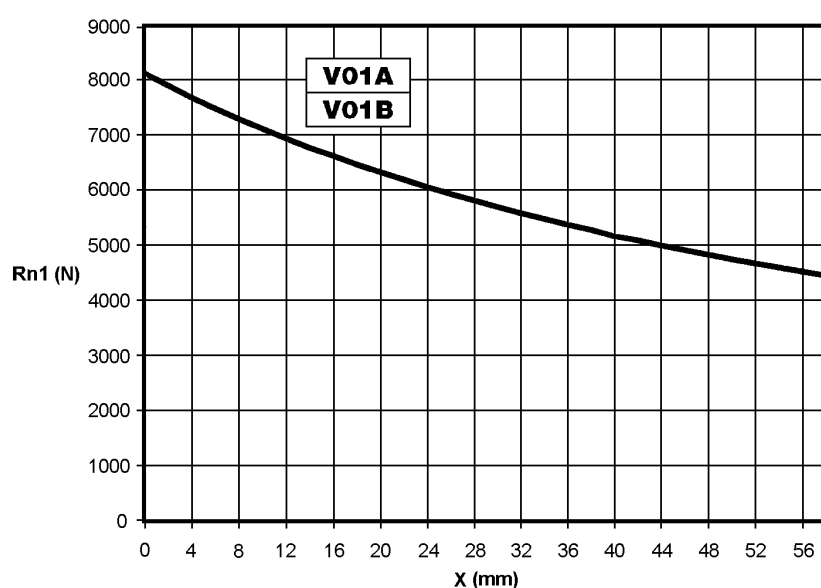
| Fattore fh <sub>2</sub> correttivo per carichi sugli alberi<br>Load corrective factor fh <sub>2</sub> on shafts<br>Korrektionsfaktor fh <sub>2</sub> für wellenbelastungen<br>Facteur de corréction fh <sub>2</sub> pour charges sur les arbres | Fh <sub>2</sub> = n <sub>2</sub> · h |                | 10 000 | 25 000 | 50 000 | 100 000 | 500 000 | 1 000 000 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------|--------|--------|--------|---------|---------|-----------|
|                                                                                                                                                                                                                                                 | fh <sub>2</sub>                      | MZ-MC-PC-PZ-FZ | 1      | 0.74   | 0.58   | 0.46    | 0.27    | 0.21      |
|                                                                                                                                                                                                                                                 |                                      | HZ - HC        | 1      | 0.76   | 0.61   | 0.50    | 0.31    | 0.25      |

Carichi radiali ammissibili sull'albero veloce per un valore di  $Fh_1 : n_1 \cdot h = 250\ 000$

Permissible radial loads on input shaft with  $Fh_1 : n_1 \cdot h = 250\ 000$

An der Antriebswelle zulässige Radiallasten für einen Wert von  $Fh_1 : n_1 \cdot h = 250\ 000$

Charges radiales admises sur l'arbre d'entrée pour une valeur de  $Fh_1 : n_1 \cdot h = 250\ 000$



| Fattore $fh_1$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_1$ on shafts<br>Korrektionsfaktor $fh_1$ für wellenbelastungen<br>Facteur de correction $fh_1$ pour charges sur les arbres | $Fh_1 = n_1 \cdot h$ | 250 000 | 500 000 | 1 000 000 | 2 000 000 | 5 000 000 | 10 000 000 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|---------|-----------|-----------|-----------|------------|
|                                                                                                                                                                                                             | $fh_1$               | 1       | 0.79    | 0.63      | 0.50      | 0.37      | 0.29       |

# 301L

**M<sub>2</sub> = 1750 Nm**

|  | i     | M <sub>n2</sub> [Nm]        |                             |                             |                              |                              |                                | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|-----------------------------------------------------------------------------------|-------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                   | 1:    | n <sub>2</sub> ·h<br>10 000 | n <sub>2</sub> ·h<br>25 000 | n <sub>2</sub> ·h<br>50 000 | n <sub>2</sub> ·h<br>100 000 | n <sub>2</sub> ·h<br>500 000 | n <sub>2</sub> ·h<br>1 000 000 | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>L1</b>                                                                         | 3.48  | 1 400                       | 1 400                       | 1 400                       | 1 300                        | 1 300                        | 1 100                          | 30             | 7.5            | 2 000                | 4 000                | 440            | 4L                                                                                  |
|                                                                                   | 4.26  | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 30             | 7.5            | 2 000                | 4 000                | 440            | 4L                                                                                  |
|                                                                                   | 5.77  | 1 700                       | 1 450                       | 1 300                       | 1 300                        | 1 300                        | 1 050                          | 30             | 7.5            | 2 000                | 4 000                | 400            | 4K                                                                                  |
|                                                                                   | 7.20  | 1 150                       | 1 150                       | 1 150                       | 1 150                        | 1 150                        | 940                            | 26             | 7.5            | 2 000                | 4 000                | 260            | 4F                                                                                  |
| <b>L2</b>                                                                         | 12.1  | 1 400                       | 1 400                       | 1 400                       | 1 300                        | 1 300                        | 1 100                          | 17.9           | 7.5            | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 14.8  | 1 400                       | 1 400                       | 1 400                       | 1 300                        | 1 300                        | 1 100                          | 14.6           | 7.5            | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 18.2  | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 15.6           | 7.5            | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 20.1  | 1 400                       | 1 400                       | 1 400                       | 1 300                        | 1 300                        | 1 100                          | 10.8           | 7.5            | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 24.6  | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 11.7           | 7.5            | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 30.7  | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 9.7            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 33.3  | 1 700                       | 1 450                       | 1 300                       | 1 300                        | 1 300                        | 1 050                          | 6.6            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 41.5  | 1 700                       | 1 450                       | 1 300                       | 1 300                        | 1 300                        | 1 050                          | 5.5            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 51.8  | 1 150                       | 1 150                       | 1 150                       | 1 150                        | 1 150                        | 940                            | 3.7            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
| <b>L3</b>                                                                         | 42.1  | 1 400                       | 1 400                       | 1 400                       | 1 300                        | 1 300                        | 1 100                          | 5.7            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 51.6  | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 6.6            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 63.2  | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 5.4            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 69.9  | 1 400                       | 1 400                       | 1 400                       | 1 300                        | 1 300                        | 1 100                          | 3.4            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 77.5  | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 4.4            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 85.6  | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 4.0            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 105   | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 3.3            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 116   | 1 700                       | 1 450                       | 1 300                       | 1 300                        | 1 300                        | 1 050                          | 2.4            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 131   | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 2.6            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 142   | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 2.4            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 177   | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 1.9            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 192   | 1 700                       | 1 450                       | 1 300                       | 1 300                        | 1 300                        | 1 050                          | 1.6            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 221   | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 1.6            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 240   | 1 700                       | 1 450                       | 1 300                       | 1 300                        | 1 300                        | 1 050                          | 1.3            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 299   | 1 700                       | 1 450                       | 1 300                       | 1 300                        | 1 300                        | 1 050                          | 1.1            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 373   | 1 150                       | 1 150                       | 1 150                       | 1 150                        | 1 150                        | 940                            | 0.53           | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
| <b>L4</b>                                                                         | 403   | 1 700                       | 1 450                       | 1 300                       | 1 300                        | 1 300                        | 1 050                          | 1.2            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 447   | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 1.3            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 494   | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 1.2            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 558   | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 1.06           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 616   | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 0.96           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 755   | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 0.78           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 819   | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 0.72           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 942   | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 0.63           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 022 | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 0.58           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 108 | 1 700                       | 1 450                       | 1 300                       | 1 300                        | 1 300                        | 1 050                          | 0.53           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 275 | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 0.46           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 383 | 1 700                       | 1 450                       | 1 300                       | 1 300                        | 1 300                        | 1 050                          | 0.43           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 591 | 2 000                       | 2 000                       | 1 750                       | 1 700                        | 1 350                        | 1 100                          | 0.37           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 725 | 1 700                       | 1 450                       | 1 300                       | 1 300                        | 1 300                        | 1 050                          | 0.34           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 153 | 1 700                       | 1 450                       | 1 300                       | 1 300                        | 1 300                        | 1 050                          | 0.27           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 687 | 1 150                       | 1 150                       | 1 150                       | 1 150                        | 1 150                        | 940                            | 0.13           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

# M<sub>2</sub> = 1750 Nm

# 301R

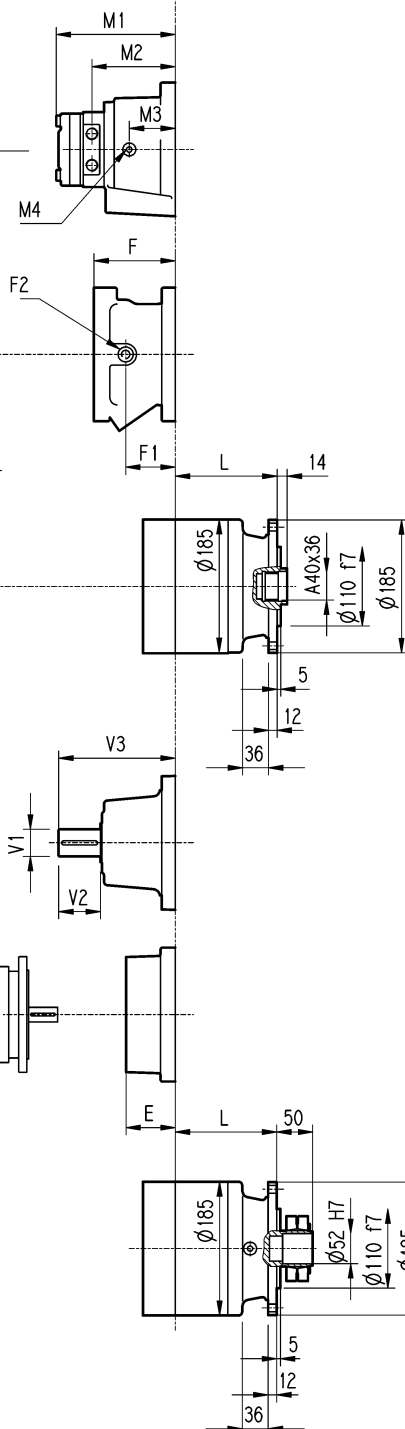
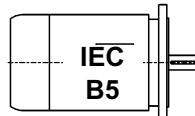
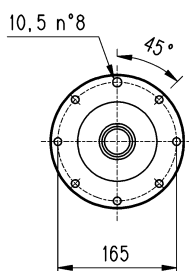
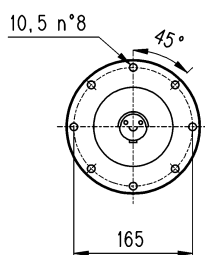
|  | i    | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|----------------------------------------------------------------------------------|------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                  |      | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h |                |                |                      |                      |                |                                                                                     |
|                                                                                  | 1:   | 10 000               | 25 000            | 50 000            | 100 000           | 500 000           | 1 000 000         | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>R2</b>                                                                        | 7.13 | 1 200                | 1 200             | 1 200             | 1 200             | 1 100             | 0 890             | 15             | 12             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 8.74 | 1 450                | 1 450             | 1 450             | 1 450             | 1 250             | 1 050             | 15             | 12             | 2 000                | 4 000                | 330            | 4H                                                                                  |
|                                                                                  | 11.8 | 1 700                | 1 450             | 1 300             | 1 300             | 1 300             | 1 050             | 15             | 12             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 14.8 | 1 150                | 1 150             | 1 150             | 1 150             | 1 150             | 940               | 13             | 12             | 2 000                | 4 000                | 160            | 4D                                                                                  |
| <b>R3</b>                                                                        | 24.8 | 1 400                | 1 400             | 1 400             | 1 300             | 1 300             | 1 100             | 9.3            | 12             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 30.4 | 1 400                | 1 400             | 1 400             | 1 300             | 1 300             | 1 100             | 7.8            | 12             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 37.3 | 2 000                | 2 000             | 1 750             | 1 700             | 1 350             | 1 100             | 8.5            | 12             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 41.2 | 1 400                | 1 400             | 1 400             | 1 300             | 1 300             | 1 100             | 5.9            | 12             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 50.4 | 2 000                | 2 000             | 1 750             | 1 700             | 1 350             | 1 100             | 6.6            | 12             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 62.9 | 2 000                | 2 000             | 1 750             | 1 700             | 1 350             | 1 100             | 5.5            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 68.2 | 1 700                | 1 450             | 1 300             | 1 300             | 1 300             | 1 050             | 3.7            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 85.2 | 1 700                | 1 450             | 1 300             | 1 300             | 1 300             | 1 050             | 3.1            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 106  | 1 150                | 1 150             | 1 150             | 1 150             | 1 150             | 940               | 1.9            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
| <b>R4</b>                                                                        | 86.4 | 1 400                | 1 400             | 1 400             | 1 300             | 1 300             | 1 100             | 4.8            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 106  | 2 000                | 2 000             | 1 750             | 1 700             | 1 350             | 1 100             | 5.5            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 130  | 2 000                | 2 000             | 1 750             | 1 700             | 1 350             | 1 100             | 4.5            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 143  | 1 400                | 1 400             | 1 400             | 1 300             | 1 300             | 1 100             | 2.9            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 159  | 2 000                | 2 000             | 1 750             | 1 700             | 1 350             | 1 100             | 3.7            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 175  | 2 000                | 2 000             | 1 750             | 1 700             | 1 350             | 1 100             | 3.3            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 215  | 2 000                | 2 000             | 1 750             | 1 700             | 1 350             | 1 100             | 2.8            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 237  | 1 700                | 1 450             | 1 300             | 1 300             | 1 300             | 1 050             | 2.1            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 268  | 2 000                | 2 000             | 1 750             | 1 700             | 1 350             | 1 100             | 2.2            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 291  | 2 000                | 2 000             | 1 750             | 1 700             | 1 350             | 1 100             | 2.0            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 363  | 2 000                | 2 000             | 1 750             | 1 700             | 1 350             | 1 100             | 1.6            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 394  | 1 700                | 1 450             | 1 300             | 1 300             | 1 300             | 1 050             | 1.4            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 453  | 2 000                | 2 000             | 1 750             | 1 700             | 1 350             | 1 100             | 1.3            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 491  | 1 700                | 1 450             | 1 300             | 1 300             | 1 300             | 1 050             | 1.1            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 613  | 1 700                | 1 450             | 1 300             | 1 300             | 1 300             | 1 050             | 1.0            | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 765  | 1 150                | 1 150             | 1 150             | 1 150             | 1 150             | 940               | 0.44           | 10             | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$



# 301L

|                 |     | Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     | <div>201</div> |      |    |  | <div>Kg</div> |
|-----------------|-----|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|----------------|------|----|--|---------------|
|                 |     | MG                                                                      |     |     |     |     |     |     |                |      |    |  |               |
| cm <sup>3</sup> | 50  | 80                                                                      | 100 | 125 | 160 | 200 | 250 | M2  | M3             | M4   |    |  |               |
| 301L1           | M1  | M1                                                                      | M1  | M1  | M1  | M1  | M1  |     |                |      |    |  |               |
| 301L2           | -   | 162                                                                     | 166 | 170 | 177 | 184 | 193 | 113 | 60             | 1/4G | 14 |  |               |
| 301L2           | 156 | 162                                                                     | 166 | 170 | 177 | -   | -   | 113 | 60             | 1/4G | 14 |  |               |



**FZ**

**FP**

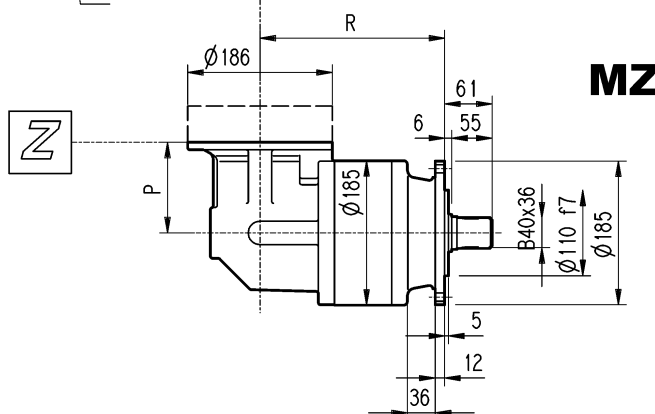
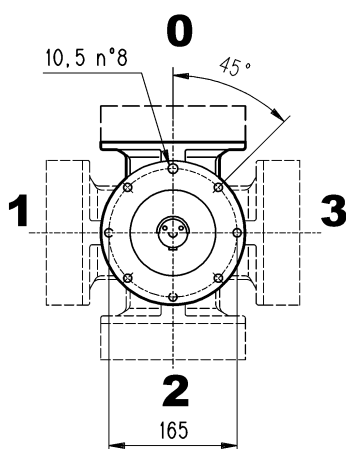
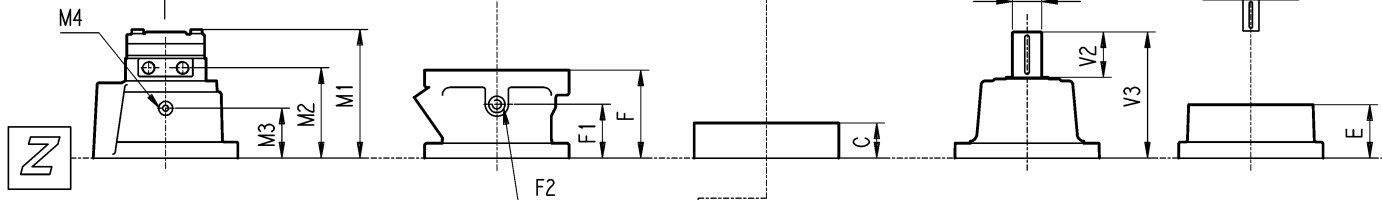
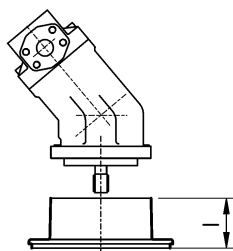
|             |                           |          |
|-------------|---------------------------|----------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 2 400 Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |          |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |          |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |          |

|        | L     |       |       |       |  |       |       |       |  |                                       |  |  |     |      |                             |                                       |                                                                                       |
|--------|-------|-------|-------|-------|-------------------------------------------------------------------------------------|-------|-------|-------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|------|-----------------------------|---------------------------------------|---------------------------------------------------------------------------------------|
|        | MZ MC | FZ FP | HZ HC | PC PZ | MZ MC                                                                               | FZ FP | HZ HC | PC PZ | C                                                                                   | Entrata<br>Input<br>Antrieb<br>Entrée | I                                                                                     | F                                                                                     | F1  | F2   | Tipo<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |  |
| 301 L1 | 92    | 92    | 127   | 133   | 21                                                                                  | 19    | 23    | 26    | 37                                                                                  | A                                     |  | 105                                                                                   | 65  | 1/4G | 4                           | A                                     | 10                                                                                    |
| 301 L2 | 145   | 145   | 180   | 186   | 25                                                                                  | 23    | 27    | 30    | 37                                                                                  | A                                     |                                                                                       | 105                                                                                   | 65  | 1/4G | 4                           | A                                     | 10                                                                                    |
| 301 L3 | 198   | 198   | 233   | 239   | 29                                                                                  | 27    | 31    | 34    | 37                                                                                  | A                                     |                                                                                       | 105                                                                                   | 65  | 1/4G | 4                           | A                                     | 10                                                                                    |
| 301 L4 | 251   | 251   | 286   | 292   | 33                                                                                  | 31    | 35    | 38    | 37                                                                                  | A                                     |                                                                                       | 191                                                                                   | 105 | 65   | 1/4G                        | 4                                     | A                                                                                     |

|        | V1 | V2 | V3    |  | V1 | V2 | V3  |  | E |        |        |        |         |         |         |         |  |  |  |
|--------|----|----|-------|-------------------------------------------------------------------------------------|----|----|-----|---------------------------------------------------------------------------------------|---|--------|--------|--------|---------|---------|---------|---------|--|--|--|
|        |    |    |       |                                                                                     |    |    |     |                                                                                       |   | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 |  |  |  |
| 301 L1 | 24 | 36 | 137.5 | 6                                                                                   | 38 | 58 | 158 | 7                                                                                     |   | 65     | 84     | 84     | 94      | 94      | 114     | 144     |  |  |  |
| 301 L2 | 24 | 36 | 137.5 | 6                                                                                   | 38 | 58 | 158 | 7                                                                                     |   | 65     | 84     | 84     | 94      | 94      | 114     | 144     |  |  |  |
| 301 L3 | 24 | 36 | 137.5 | 6                                                                                   | 38 | 58 | 158 | 7                                                                                     |   | 65     | 84     | 84     | 94      | 94      | 114     | 144     |  |  |  |
| 301 L4 | 24 | 36 | 137.5 | 6                                                                                   | 38 | 58 | 158 | 7                                                                                     |   | 65     | 84     | 84     | 94      | 94      | 114     | 144     |  |  |  |

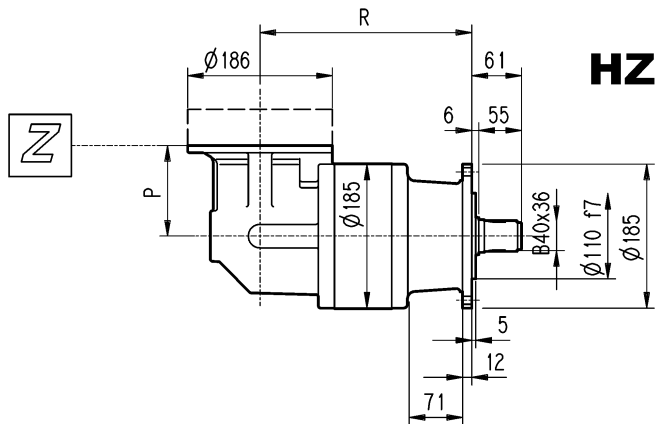
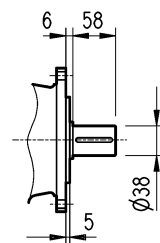
# 301R

| Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     |     |     |    |      |
|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|----|------|
| MG                                                                      |     |     |     |     |     |     |     | 201 |    |      |
| cm <sup>3</sup>                                                         | 50  | 80  | 100 | 125 | 160 | 200 | 250 | M2  | M3 | M4   |
| 301R2                                                                   | 156 | 162 | 166 | 170 | 177 | -   | -   | 113 | 60 | 1/4G |
|                                                                         |     |     |     |     |     |     |     |     |    | 14   |



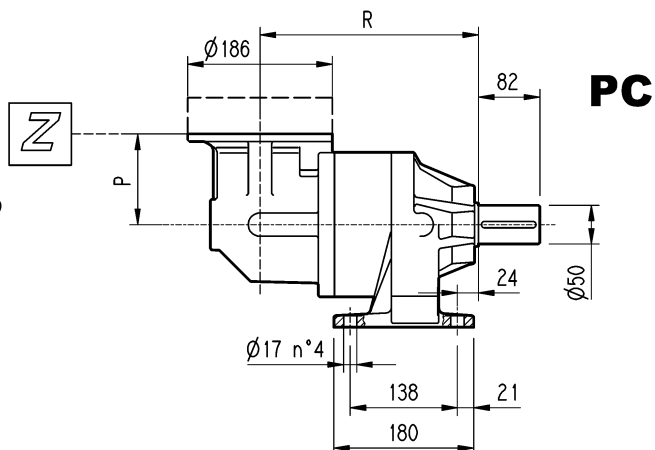
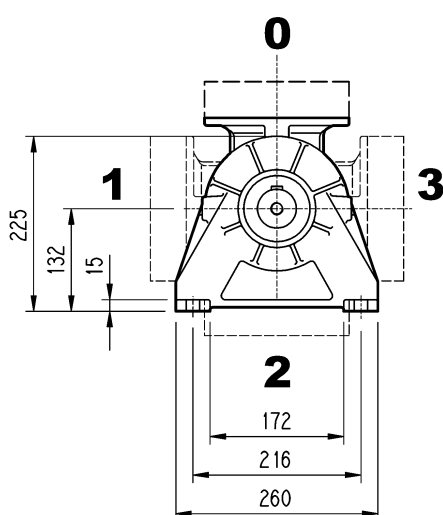
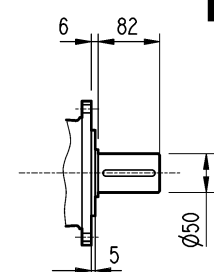
**MZ**

**MC**



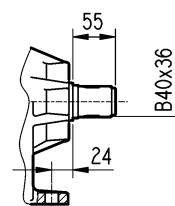
**HZ**

**HC**

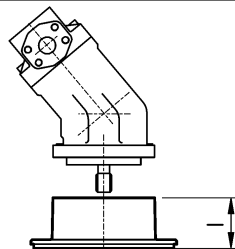


**PC**

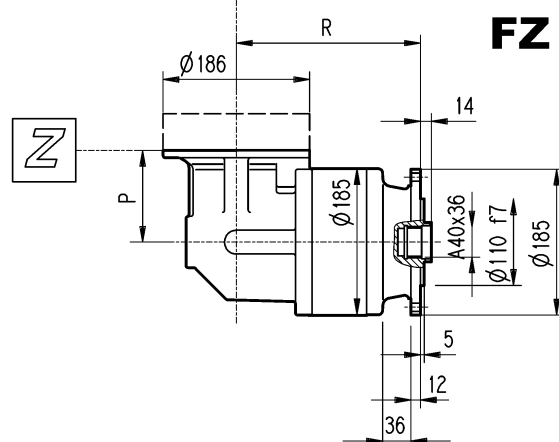
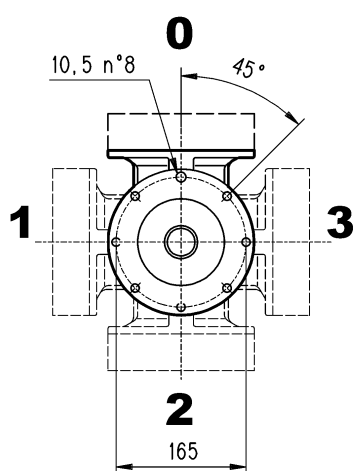
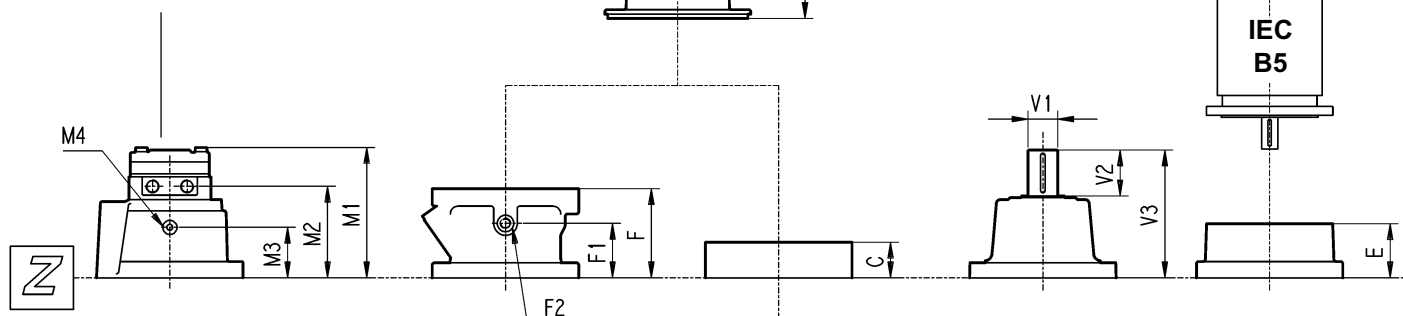
**PZ**



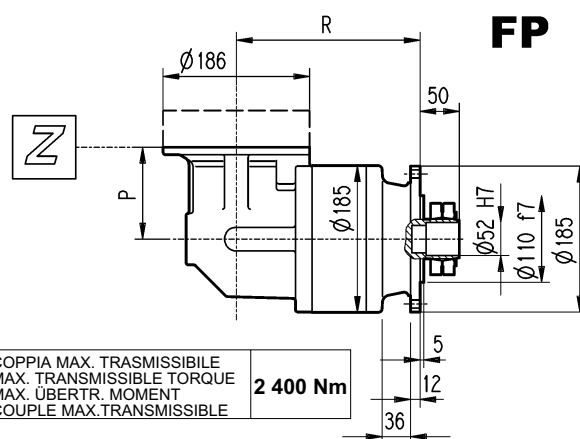
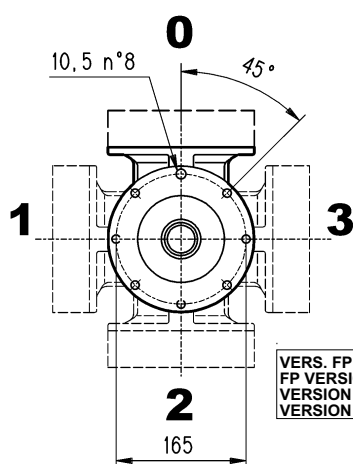
| Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     |     |     |    |         |
|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|----|---------|
| MG                                                                      |     |     |     |     |     |     |     | 201 |    |         |
| cm <sup>3</sup>                                                         | 50  | 80  | 100 | 125 | 160 | 200 | 250 | M2  | M3 | M4      |
| 301R2                                                                   | 156 | 162 | 166 | 170 | 177 | -   | -   | 113 | 60 | 1/4G 14 |



**301R**



**FZ**



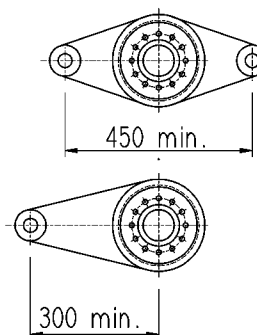
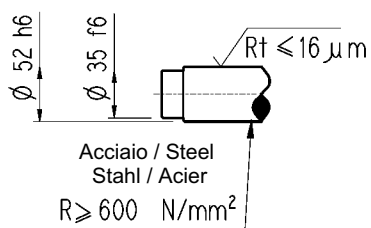
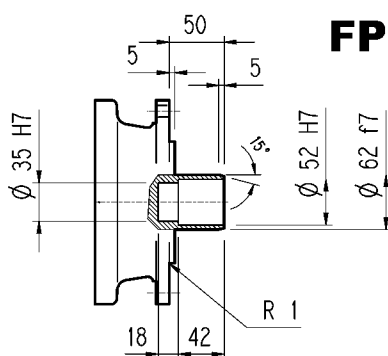
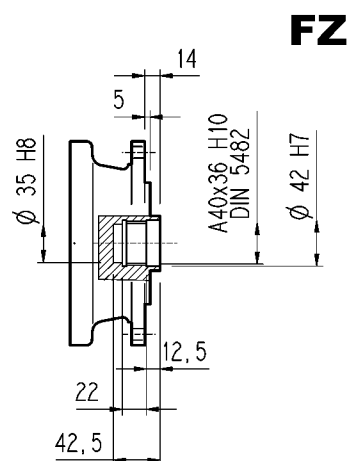
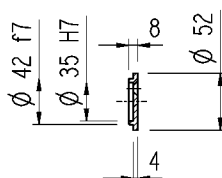
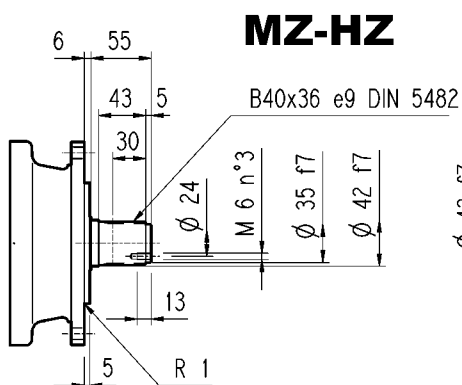
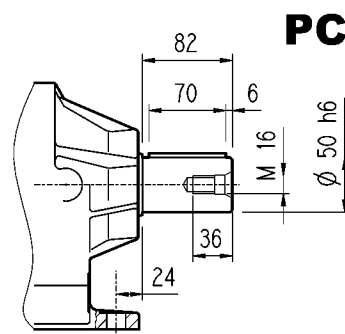
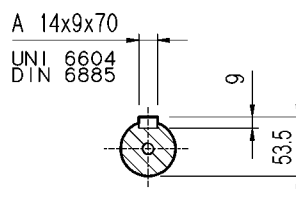
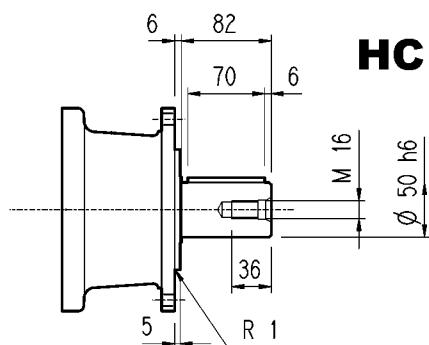
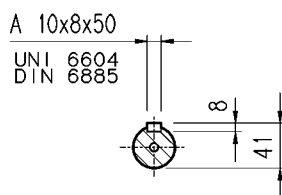
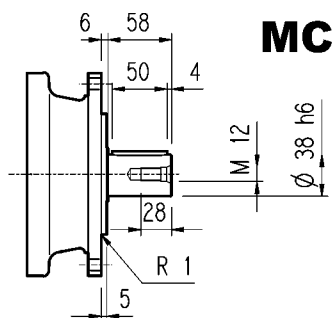
**FP**

|            |                           |          |
|------------|---------------------------|----------|
| VERS. FP   | COPPIA MAX. TRASMISSIBILE | 2 400 Nm |
| FP VERSION | MAX. TRANSMISSIBLE TORQUE |          |
| VERSION FP | MAX. ÜBERTR. MOMENT       |          |
| VERSION FP | COUPLE MAX. TRANSMISSIBLE |          |

|        | R     |       |       |       | P   |  |       |       |       |  |                              |  |  |     |      |                    |                              |                                                                                       |
|--------|-------|-------|-------|-------|-----|-------------------------------------------------------------------------------------|-------|-------|-------|-------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|------|--------------------|------------------------------|---------------------------------------------------------------------------------------|
|        | MZ MC | FZ FP | HZ HC | PC PZ |     | MZ MC                                                                               | FZ FP | HZ HC | PC PZ | C                                                                                   | Entrata Input Antrieb Entrée | I                                                                                     | F                                                                                     | F1  | F2   | Tipo Type Typ Type | Entrata Input Antrieb Entrée |  |
| 301 R2 | 184   | 184   | 219   | 225   | 122 | 35                                                                                  | 33    | 37    | 40    | 37                                                                                  | A                            |  | 105                                                                                   | 65  | 1/4G | 4                  | A                            | 10                                                                                    |
| 301 R3 | 237   | 237   | 272   | 278   | 122 | 39                                                                                  | 37    | 41    | 44    | 37                                                                                  | A                            |                                                                                       | 105                                                                                   | 65  | 1/4G | 4                  | A                            | 10                                                                                    |
| 301 R4 | 290   | 290   | 325   | 331   | 122 | 43                                                                                  | 41    | 45    | 48    | 37                                                                                  | A                            |                                                                                       | 191                                                                                   | 105 | 65   | 1/4G               | 4                            | A                                                                                     |

|        | V1 | V2 | V3    | Kg | V1 | V2 | V3  | Kg | E      |        |        |         |         |         |
|--------|----|----|-------|----|----|----|-----|----|--------|--------|--------|---------|---------|---------|
|        |    |    |       |    |    |    |     |    | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 |
| 301 R2 | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     |
| 301 R3 | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     |
| 301 R4 | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     |

## 301L - 301R



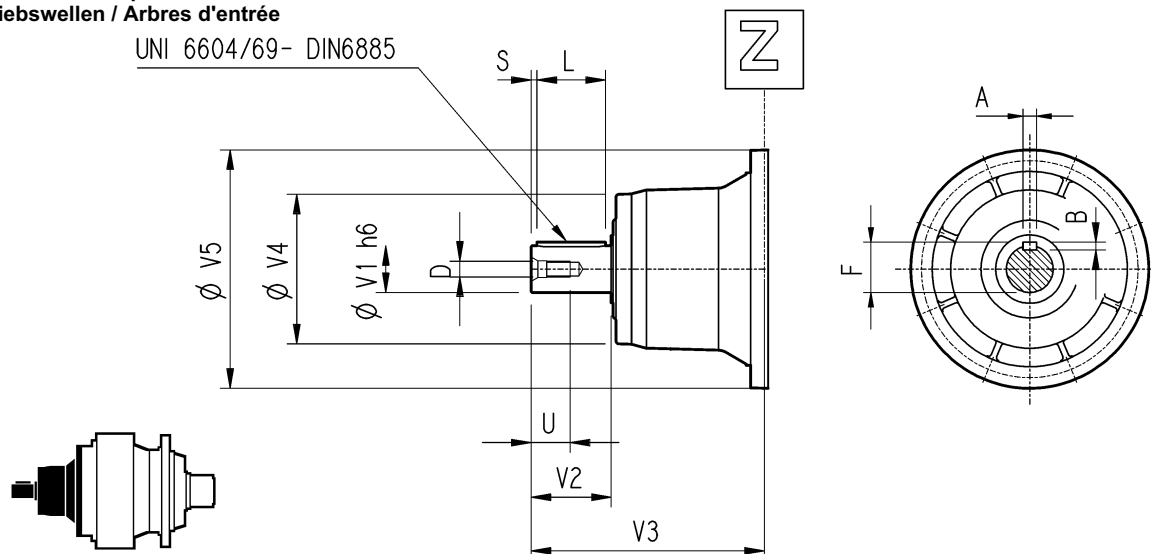
|             |                           |          |
|-------------|---------------------------|----------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 2 400 Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |          |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |          |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |          |



## 301L - 301R

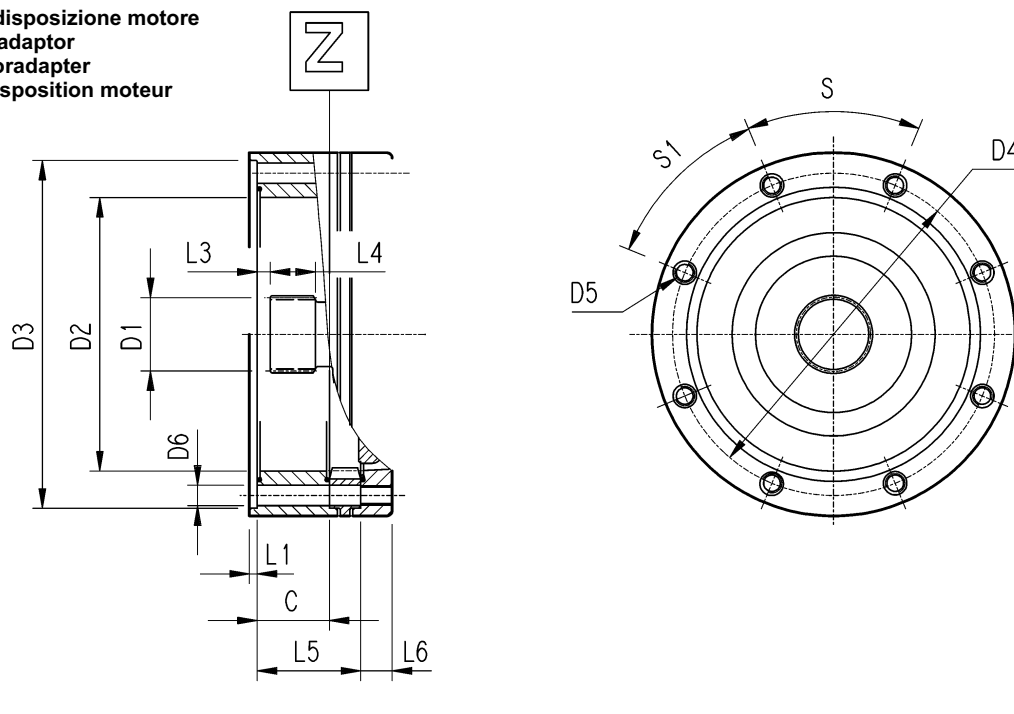
Algeri veloci / Input shaft  
Antriebswellen / Arbres d'entrée

UNI 6604/69- DIN6885



|              | CODE | V1 | V2 | V3    | V4  | V5  | A  | B | F  | L  | S | D   | U  |
|--------------|------|----|----|-------|-----|-----|----|---|----|----|---|-----|----|
| 301 L1       | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27 | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41 | 50 | 4 | M12 | 28 |
| 301 L2       | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27 | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41 | 50 | 4 | M12 | 28 |
| 301 L3       | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27 | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41 | 50 | 4 | M12 | 28 |
| 301 L4       | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27 | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41 | 50 | 4 | M12 | 28 |
| 301 R2-R3-R4 | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27 | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41 | 50 | 4 | M12 | 28 |

Dimensioni d'entrata senza predisposizione motore  
Input dimension without motor adaptor  
Maße für den Antrieb ohne Motoradapter  
Dimensions d'entrée sans prédisposition moteur



|              | C  | D1            | D2  | D3     | D4  | D5      | D6 | L1 | L2 | L3 | L4 | L5  | L6 | S   | S1  | Entrata<br>Input<br>Antrieb<br>Entrée |
|--------------|----|---------------|-----|--------|-----|---------|----|----|----|----|----|-----|----|-----|-----|---------------------------------------|
| 301 L1       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 65  | 18 | 45° | 45° | A                                     |
| 301 L2       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 118 | 18 | 45° | 45° | A                                     |
| 301 L3       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 171 | 18 | 45° | 45° | A                                     |
| 301 L4       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 224 | 18 | 45° | 45° | A                                     |
| 301 R2-R3-R4 | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 37  | 18 | 45° | 45° | A                                     |

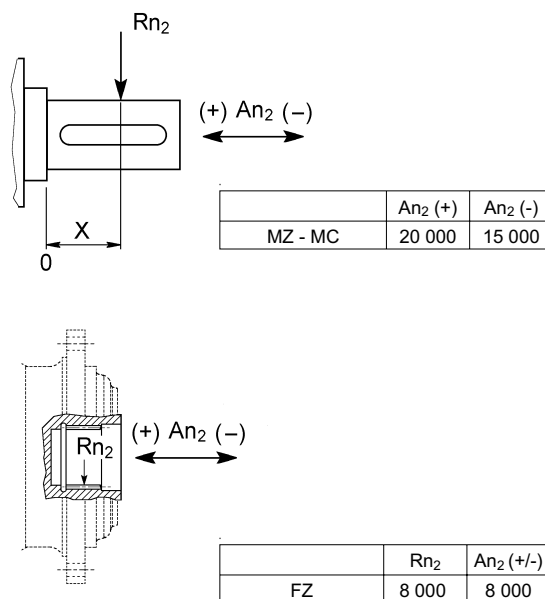
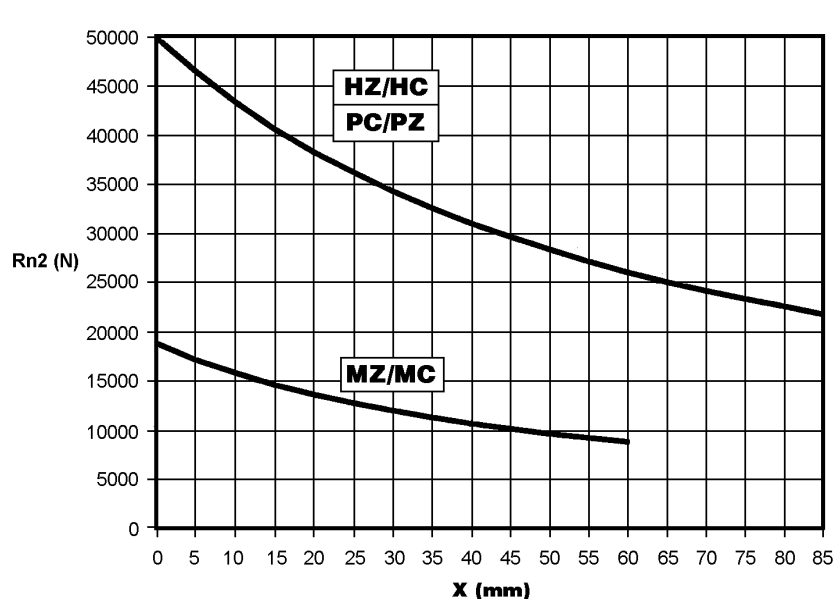
## 301L - 301R

Carichi radiali ed assiali ammissibili sull'albero lento per un valore di  $Fh_2 : n_2 \cdot h = 10\,000$

Permissible radial and axial loads on output shaft with  $Fh_2 : n_2 \cdot h = 10\,000$

An der Ausgangswelle zulässige Radiallasten und Axialkräfte für einen Wert von  $Fh_2 : n_2 \cdot h = 10\,000$

Charges radiales et axiales admises sur l'arbre lent pour une valeur de  $Fh_2 : n_2 \cdot h = 10\,000$



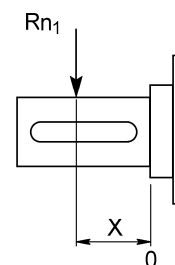
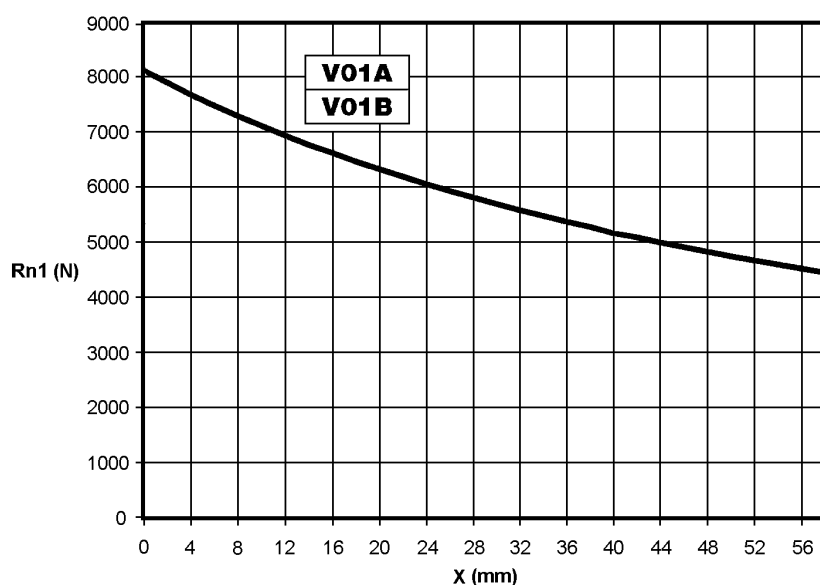
| Fattore $fh_2$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_2$ on shafts<br>Korrektionsfaktor $fh_2$ für wellenbelastungen<br>Facteur de correction $fh_2$ pour charges sur les arbres | $Fh_2 = n_2 \cdot h$ |                   | 10 000 | 25 000 | 50 000 | 100 000 | 500 000 | 1 000 000 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|--------|--------|--------|---------|---------|-----------|
|                                                                                                                                                                                                             | $fh_2$               |                   |        |        |        |         |         |           |
|                                                                                                                                                                                                             |                      | MZ - MC - FZ      | 1      | 0.74   | 0.58   | 0.46    | 0.27    | 0.21      |
|                                                                                                                                                                                                             |                      | HZ - HC - PC - PZ | 1      | 0.76   | 0.61   | 0.50    | 0.31    | 0.25      |

Carichi radiali ammissibili sull'albero veloce per un valore di  $Fh_1 : n_1 \cdot h = 250\,000$

Permissible radial loads on input shaft with  $Fh_1 : n_1 \cdot h = 250\,000$

An der Antriebswelle zulässige Radiallasten für einen Wert von  $Fh_1 : n_1 \cdot h = 250\,000$

Charges radiales admises sur l'arbre d'entrée pour une valeur de  $Fh_1 : n_1 \cdot h = 250\,000$



| Fattore $fh_1$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_1$ on shafts<br>Korrektionsfaktor $fh_1$ für wellenbelastungen<br>Facteur de correction $fh_1$ pour charges sur les arbres | $Fh_1 = n_1 \cdot h$ |  | 250 000 | 500 000 | 1 000 000 | 2 000 000 | 5 000 000 | 10 000 000 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--|---------|---------|-----------|-----------|-----------|------------|
|                                                                                                                                                                                                             | $fh_1$               |  | 1       | 0.79    | 0.63      | 0.50      | 0.37      | 0.29       |

# 303L

**M<sub>2</sub> = 2500 Nm**

|  | i     | M <sub>n2</sub> [Nm]        |                             |                             |                              |                              |                                | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|-----------------------------------------------------------------------------------|-------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                   | 1:    | n <sub>2</sub> ·h<br>10 000 | n <sub>2</sub> ·h<br>25 000 | n <sub>2</sub> ·h<br>50 000 | n <sub>2</sub> ·h<br>100 000 | n <sub>2</sub> ·h<br>500 000 | n <sub>2</sub> ·h<br>1 000 000 | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>L1</b>                                                                         | 3.60  | 2 300                       | 2 200                       | 2 150                       | 2 100                        | 2 100                        | 1 750                          | 40             | 11             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                   | 4.25  | 2 900                       | 2 750                       | 2 650                       | 2 600                        | 2 150                        | 1 750                          | 40             | 11             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                   | 5.33  | 2 850                       | 2 450                       | 2 200                       | 2 200                        | 2 100                        | 1 700                          | 40             | 11             | 1 800                | 3 800                | 630            | 5E                                                                                  |
|                                                                                   | 6.20  | 2 300                       | 2 000                       | 1 800                       | 1 800                        | 1 750                        | 1 400                          | 40             | 11             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                   | 7.50  | 2 000                       | 1 750                       | 1 650                       | 1 650                        | 1 650                        | 1 500                          | 36             | 11             | 1 800                | 3 800                | 400            | 5B                                                                                  |
| <b>L2</b>                                                                         | 12.5  | 2 300                       | 2 200                       | 2 150                       | 2 100                        | 1 850                        | 1 500                          | 20             | 9              | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 15.3  | 2 300                       | 2 200                       | 2 150                       | 2 100                        | 1 800                        | 1 450                          | 20             | 9              | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 18.1  | 2 900                       | 2 750                       | 2 650                       | 2 600                        | 2 000                        | 1 650                          | 20             | 9              | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 20.8  | 2 300                       | 2 200                       | 2 150                       | 2 100                        | 1 700                        | 1 400                          | 17.0           | 9              | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 22.7  | 2 850                       | 2 450                       | 2 200                       | 2 200                        | 2 100                        | 1 700                          | 16.2           | 9              | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 24.5  | 2 750                       | 2 700                       | 2 650                       | 2 600                        | 1 900                        | 1 550                          | 17.8           | 9              | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 26.4  | 2 300                       | 2 000                       | 1 800                       | 1 800                        | 1 750                        | 1 400                          | 11.4           | 9              | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 30.8  | 2 850                       | 2 450                       | 2 200                       | 2 200                        | 2 100                        | 1 700                          | 12.0           | 9              | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 35.8  | 2 300                       | 2 000                       | 1 800                       | 1 800                        | 1 750                        | 1 400                          | 8.5            | 9              | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 38.4  | 2 850                       | 2 450                       | 2 200                       | 2 200                        | 2 000                        | 1 600                          | 10.0           | 9              | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 44.6  | 2 300                       | 2 000                       | 1 800                       | 1 800                        | 1 750                        | 1 400                          | 7.0            | 9              | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 54.0  | 2 000                       | 1 750                       | 1 650                       | 1 650                        | 1 650                        | 1 500                          | 5.3            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
| <b>L3</b>                                                                         | 43.6  | 2 300                       | 2 200                       | 2 150                       | 2 100                        | 1 900                        | 1 500                          | 8.6            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 53.4  | 2 300                       | 2 200                       | 2 150                       | 2 100                        | 1 800                        | 1 450                          | 7.1            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 63.1  | 2 886                       | 2 700                       | 2 650                       | 2 600                        | 2 100                        | 1 700                          | 7.3            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 72.3  | 2 300                       | 2 200                       | 2 150                       | 2 100                        | 1 900                        | 1 500                          | 5.3            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 77.2  | 2 900                       | 2 750                       | 2 650                       | 2 600                        | 2 000                        | 1 650                          | 6.2            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 90.2  | 2 300                       | 2 200                       | 2 150                       | 2 100                        | 1 900                        | 1 500                          | 4.3            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 105   | 2 900                       | 2 750                       | 2 650                       | 2 600                        | 2 000                        | 1 650                          | 4.7            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 113   | 2 300                       | 2 000                       | 1 800                       | 1 800                        | 1 750                        | 1 400                          | 3.4            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 124   | 2 300                       | 2 000                       | 1 800                       | 1 800                        | 1 750                        | 1 400                          | 3.1            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 141   | 2 750                       | 2 700                       | 2 650                       | 2 600                        | 1 900                        | 1 550                          | 3.3            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 152   | 2 300                       | 2 000                       | 1 800                       | 1 800                        | 1 750                        | 1 400                          | 2.6            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 164   | 2 850                       | 2 450                       | 2 200                       | 2 200                        | 2 100                        | 1 700                          | 3.0            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 178   | 2 850                       | 2 450                       | 2 200                       | 2 200                        | 2 100                        | 1 700                          | 2.8            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 190   | 2 300                       | 2 000                       | 1 800                       | 1 800                        | 1 750                        | 1 400                          | 2.2            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 220   | 2 250                       | 2 200                       | 2 250                       | 2 250                        | 1 700                        | 1 400                          | 1.9            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 258   | 2 300                       | 2 000                       | 1 800                       | 1 800                        | 1 750                        | 1 400                          | 1.7            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 276   | 2 850                       | 2 450                       | 2 200                       | 2 200                        | 2 000                        | 1 600                          | 1.9            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 312   | 2 000                       | 1 750                       | 1 650                       | 1 650                        | 1 650                        | 1 500                          | 1.2            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 389   | 2 000                       | 1 750                       | 1 650                       | 1 650                        | 1 650                        | 1 500                          | 1.0            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
| <b>L4</b>                                                                         | 413   | 2 850                       | 2 450                       | 2 200                       | 2 200                        | 2 100                        | 1 700                          | 2.0            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 446   | 2 900                       | 2 750                       | 2 650                       | 2 600                        | 2 000                        | 1 650                          | 2.0            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 492   | 2 750                       | 2 700                       | 2 650                       | 2 600                        | 1 900                        | 1 550                          | 1.6            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 556   | 2 900                       | 2 750                       | 2 650                       | 2 600                        | 2 000                        | 1 650                          | 1.6            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 649   | 2 300                       | 2 200                       | 2 150                       | 2 100                        | 1 850                        | 1 500                          | 1.1            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 718   | 2 300                       | 2 000                       | 1 800                       | 1 800                        | 1 750                        | 1 400                          | 1.1            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 816   | 2 750                       | 2 700                       | 2 650                       | 2 600                        | 1 900                        | 1 550                          | 1.1            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 896   | 2 300                       | 2 000                       | 1 800                       | 1 800                        | 1 750                        | 1 400                          | 0.94           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 018 | 2 750                       | 2 700                       | 2 650                       | 2 600                        | 1 900                        | 1 550                          | 0.91           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 098 | 2 300                       | 2 000                       | 1 800                       | 1 800                        | 1 750                        | 1 400                          | 0.79           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 278 | 2 850                       | 2 450                       | 2 200                       | 2 200                        | 2 100                        | 1 700                          | 0.74           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 370 | 2 300                       | 2 000                       | 1 800                       | 1 800                        | 1 750                        | 1 400                          | 0.66           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 586 | 2 250                       | 2 250                       | 2 250                       | 2 250                        | 1 700                        | 1 350                          | 0.58           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 854 | 2 300                       | 2 000                       | 1 800                       | 1 800                        | 1 750                        | 1 400                          | 0.51           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 991 | 2 850                       | 2 450                       | 2 200                       | 2 200                        | 2 000                        | 1 600                          | 0.48           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 243 | 2 000                       | 1 750                       | 1 650                       | 1 650                        | 1 650                        | 1 500                          | 0.37           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 799 | 2 000                       | 1 750                       | 1 650                       | 1 650                        | 1 650                        | 1 500                          | 0.30           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

# M<sub>2</sub> = 2500 Nm

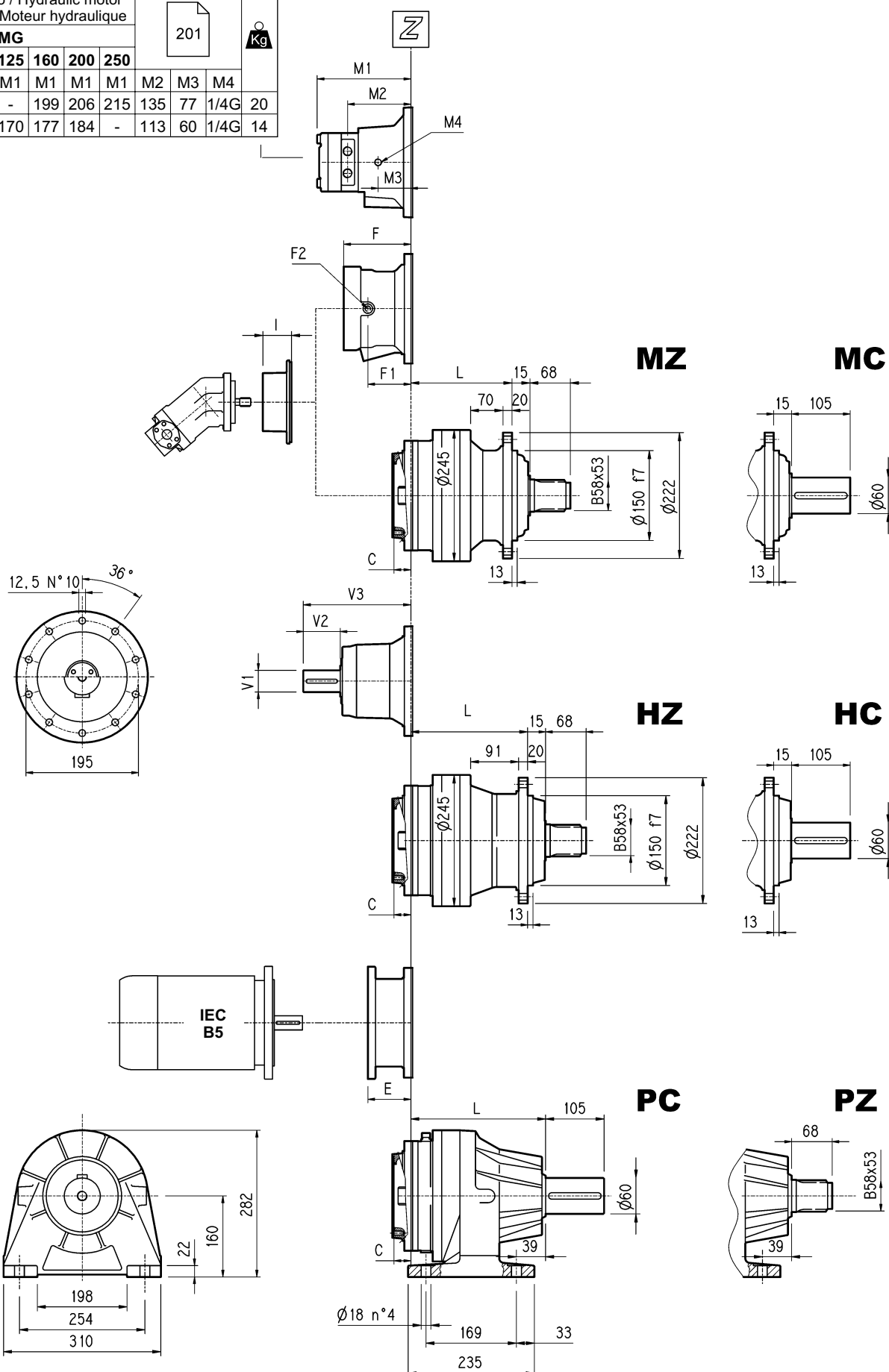
# 303R

|  | i    | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|----------------------------------------------------------------------------------|------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                  |      | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h |                |                |                      |                      |                |                                                                                     |
|                                                                                  | 1:   | 10 000               | 25 000            | 50 000            | 100 000           | 500 000           | 1 000 000         | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>R2</b>                                                                        | 9.23 | 2 300                | 2 200             | 2 150             | 2 100             | 2 000             | 1 600             | 35             | 18             | 1 800                | 3 800                | 330            | 4H                                                                                  |
|                                                                                  | 10.9 | 2 900                | 2 750             | 2 650             | 2 600             | 2 150             | 1 750             | 35             | 18             | 1 800                | 3 800                | 330            | 4H                                                                                  |
|                                                                                  | 13.7 | 2 850                | 2 450             | 2 200             | 2 200             | 2 100             | 1 700             | 27             | 18             | 1 800                | 3 800                | 260            | 4F                                                                                  |
|                                                                                  | 15.9 | 2 300                | 2 000             | 1 800             | 1 800             | 1 750             | 1 400             | 18.9           | 18             | 1 800                | 3 800                | 260            | 4F                                                                                  |
|                                                                                  | 19.2 | 2 000                | 1 750             | 1 650             | 1 650             | 1 650             | 1 500             | 14.3           | 18             | 1 800                | 3 800                | 160            | 4D                                                                                  |
| <b>R3</b>                                                                        | 25.7 | 2 300                | 2 200             | 2 150             | 2 100             | 1 850             | 1 500             | 14.3           | 14             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 31.5 | 2 300                | 2 200             | 2 150             | 2 100             | 1 800             | 1 450             | 11.8           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 37.1 | 2 900                | 2 750             | 2 650             | 2 600             | 2 000             | 1 650             | 12.4           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 42.6 | 2 300                | 2 200             | 2 150             | 2 100             | 1 700             | 1 400             | 8.8            | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 46.6 | 2 850                | 2 450             | 2 200             | 2 200             | 2 100             | 1 700             | 8.7            | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 50.3 | 2 750                | 2 700             | 2 650             | 2 600             | 1 900             | 1 550             | 9.2            | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 54.2 | 2 300                | 2 000             | 1 800             | 1 800             | 1 750             | 1 400             | 6.2            | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 63.1 | 2 850                | 2 450             | 2 200             | 2 200             | 2 100             | 1 700             | 6.8            | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 73.3 | 2 300                | 2 000             | 1 800             | 1 800             | 1 750             | 1 400             | 4.8            | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 78.7 | 2 850                | 2 450             | 2 200             | 2 200             | 2 000             | 1 600             | 5.6            | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 91.5 | 2 300                | 2 000             | 1 800             | 1 800             | 1 750             | 1 400             | 4.0            | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 111  | 2 000                | 1 750             | 1 650             | 1 650             | 1 650             | 1 500             | 3.0            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
| <b>R4</b>                                                                        | 129  | 2 850                | 2 700             | 2 650             | 2 600             | 2 100             | 1 700             | 6.1            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 148  | 2 300                | 2 200             | 2 150             | 2 100             | 1 850             | 1 500             | 4.5            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 158  | 2 900                | 2 750             | 2 650             | 2 600             | 2 000             | 1 650             | 5.3            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 185  | 2 300                | 2 200             | 2 150             | 2 100             | 1 850             | 1 500             | 3.6            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 214  | 2 900                | 2 750             | 2 650             | 2 600             | 2 000             | 1 650             | 4.0            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 231  | 2 300                | 2 000             | 1 800             | 1 800             | 1 750             | 1 400             | 2.9            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 255  | 2 300                | 2 000             | 1 800             | 1 800             | 1 750             | 1 400             | 2.7            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 290  | 2 750                | 2 700             | 2 650             | 2 600             | 1 900             | 1 550             | 2.9            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 313  | 2 300                | 2 000             | 1 800             | 1 800             | 1 750             | 1 400             | 2.3            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 336  | 2 850                | 2 450             | 2 200             | 2 200             | 2 100             | 1 700             | 2.5            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 364  | 2 850                | 2 450             | 2 200             | 2 200             | 2 100             | 1 700             | 2.5            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 390  | 2 300                | 2 000             | 1 800             | 1 800             | 1 750             | 1 400             | 1.9            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 452  | 2 250                | 2 250             | 2 250             | 2 250             | 1 700             | 1 400             | 1.6            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 528  | 2 300                | 2 000             | 1 800             | 1 800             | 1 750             | 1 400             | 1.3            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 567  | 2 850                | 2 450             | 2 200             | 2 200             | 2 000             | 1 600             | 1.6            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 639  | 2 000                | 1 750             | 1 650             | 1 650             | 1 650             | 1 500             | 1.1            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 797  | 2 000                | 1 750             | 1 650             | 1 650             | 1 650             | 1 500             | 0.88           | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

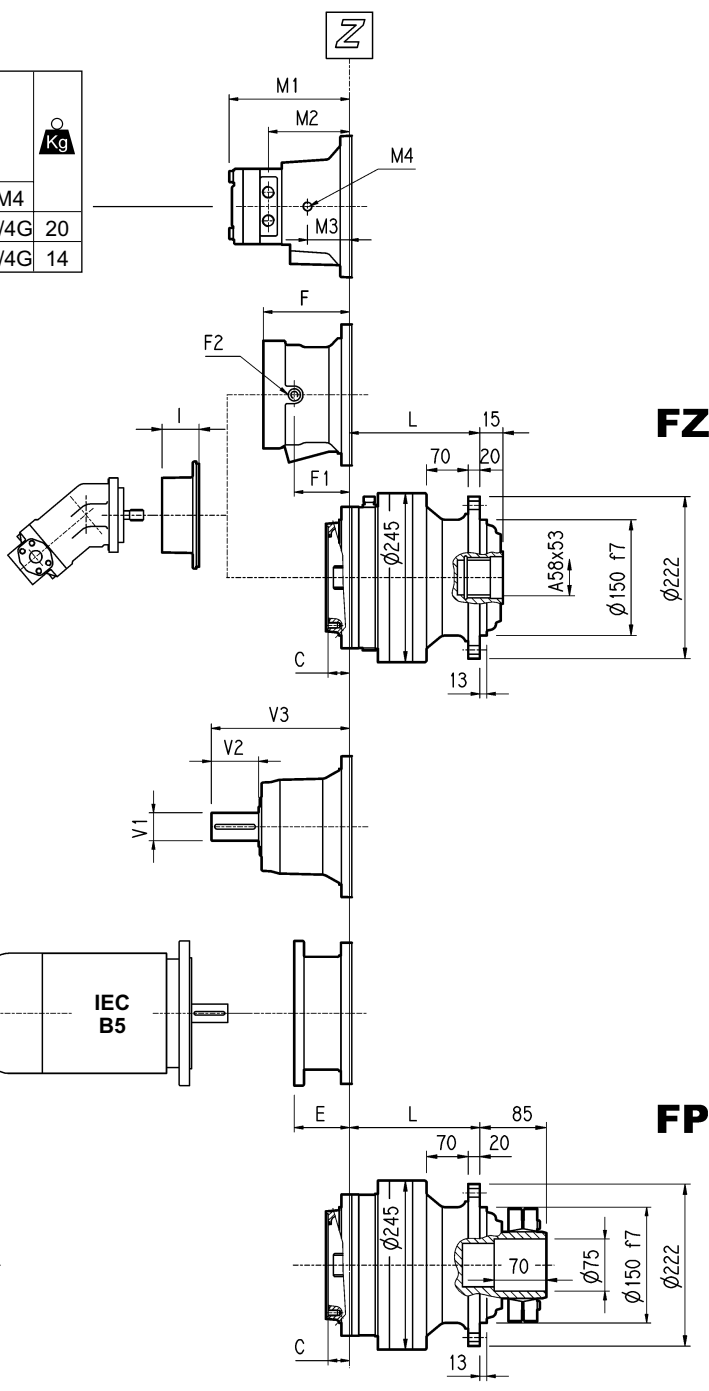
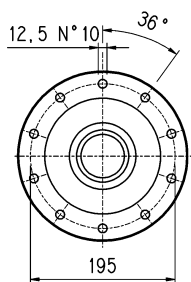
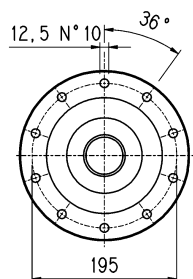
## 303L

|       | Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     | <div> 201</div> <div> Kg</div> |    |      |    |     |
|-------|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------|----|-----|
|       | MG                                                                      |     |     |     |     |     |     |                                                                                                                                                                                                  |    |      |    |     |
|       | cm <sup>3</sup>                                                         | 50  | 80  | 100 | 125 | 160 | 200 |                                                                                                                                                                                                  |    |      |    | 250 |
|       | M1                                                                      | M1  | M1  | M1  | M1  | M1  | M1  | M1                                                                                                                                                                                               | M2 | M3   | M4 |     |
| 303L1 | -                                                                       | -   | -   | -   | 199 | 206 | 215 | 135                                                                                                                                                                                              | 77 | 1/4G | 20 |     |
| 303L2 | 156                                                                     | 162 | 166 | 170 | 177 | 184 | -   | 113                                                                                                                                                                                              | 60 | 1/4G | 14 |     |



# 303L

|                 |     | Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     |     |      |    |
|-----------------|-----|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|------|----|
|                 |     | MG                                                                      |     |     |     |     |     |     | 201 |      |    |
| cm <sup>3</sup> | 50  | 80                                                                      | 100 | 125 | 160 | 200 | 250 |     |     |      | Kg |
|                 | M1  | M1                                                                      | M1  | M1  | M1  | M1  | M1  | M2  | M3  | M4   |    |
| 303L1           | -   | -                                                                       | -   | -   | 199 | 206 | 215 | 135 | 77  | 1/4G | 20 |
| 303L2           | 156 | 162                                                                     | 166 | 170 | 177 | 184 | -   | 113 | 60  | 1/4G | 14 |



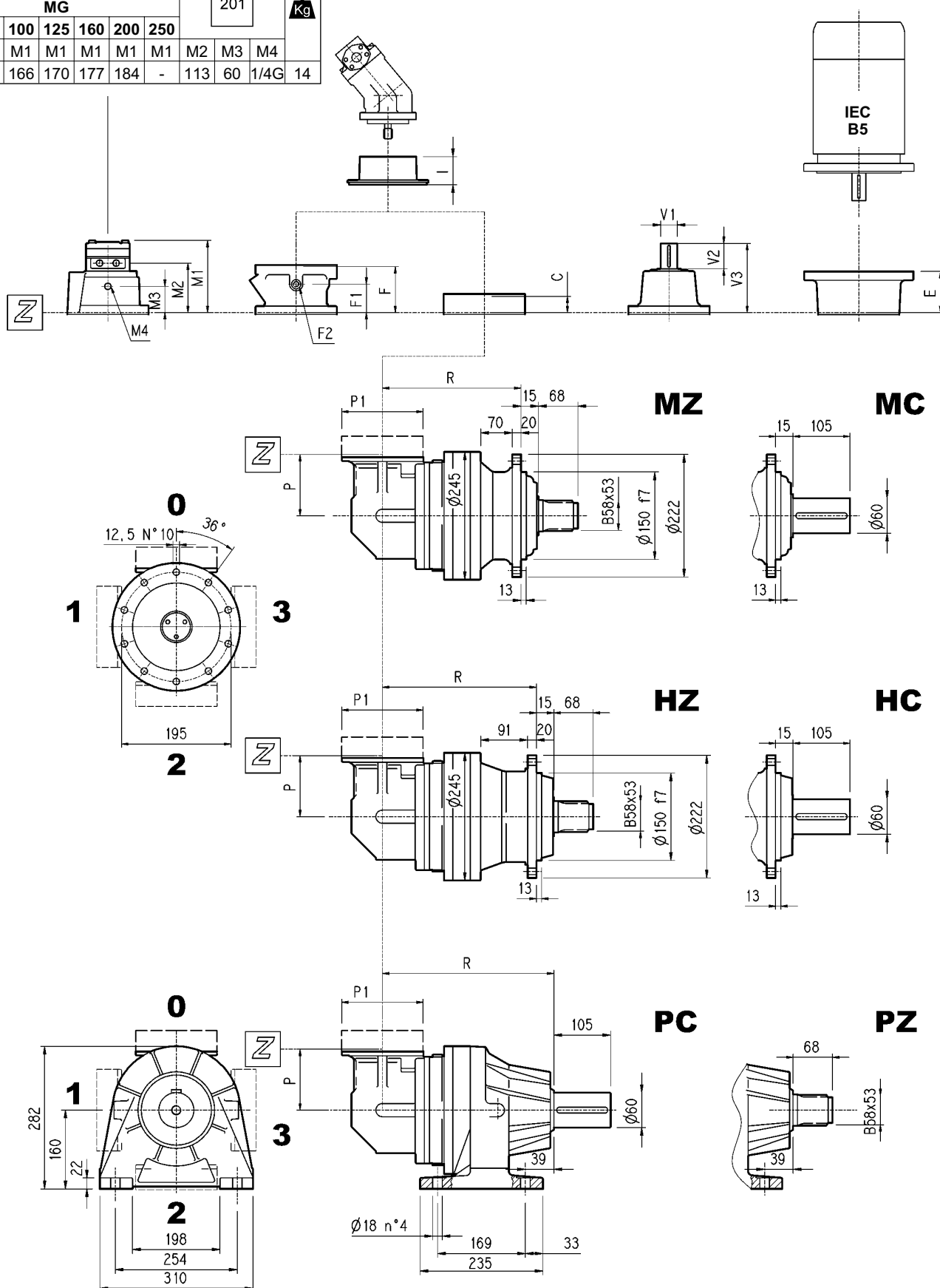
|                                                       |                                                                                                            |          |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | 3 500 Nm |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------|

|        | L     |       |       |       |  |       |       |       |  |                                    |  |  |     |       |                  |                                    |                                                                                       |    |
|--------|-------|-------|-------|-------|-------------------------------------------------------------------------------------|-------|-------|-------|-------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-------|------------------|------------------------------------|---------------------------------------------------------------------------------------|----|
|        | MZ MC | FZ FP | HZ HC | PC PZ | MZ MC                                                                               | FZ FP | HZ HC | PC PZ | C                                                                                   | Entrata Input<br>Antrieb<br>Entrée | I                                                                                     | F                                                                                     | F1  | F2    | Typo Type<br>Typ | Entrata Input<br>Antrieb<br>Entrée |  |    |
| 303 L1 | 125   | 125   | 150   | 165   | 31                                                                                  | 31    | 35    | 40    | 37                                                                                  | A                                  |  | 145                                                                                   | 95  | 1/4 G | 5                | A                                  | 16                                                                                    |    |
| 303 L2 | 178   | 178   | 203   | 218   | 35                                                                                  | 35    | 39    | 44    | 37                                                                                  | A                                  |                                                                                       | 105                                                                                   | 65  | 1/4 G | 4                | A                                  | 10                                                                                    |    |
| 303 L3 | 231   | 231   | 256   | 271   | 39                                                                                  | 39    | 43    | 48    | 37                                                                                  | A                                  |                                                                                       | 105                                                                                   | 65  | 1/4 G | 4                | A                                  | 10                                                                                    |    |
| 303 L4 | 284   | 284   | 309   | 324   | 43                                                                                  | 43    | 47    | 52    | 37                                                                                  | A                                  |                                                                                       | 191                                                                                   | 105 | 65    | 1/4 G            | 4                                  | A                                                                                     | 10 |

|        | V1 | V2 | V3    |  Kg | V1 | V2 | V3  |  Kg | E |        |        |        |         |         |         |         |         |         |
|--------|----|----|-------|----------------------------------------------------------------------------------------|----|----|-----|------------------------------------------------------------------------------------------|---|--------|--------|--------|---------|---------|---------|---------|---------|---------|
|        |    |    |       |                                                                                        |    |    |     |                                                                                          |   | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 | IEC 200 |
| 303 L1 | 48 | 82 | 239   | 15                                                                                     |    |    |     |                                                                                          |   |        |        |        |         |         | 114     | 144     | 144     | 174     |
| 303 L2 | 24 | 36 | 137.5 | 6                                                                                      | 38 | 58 | 158 | 7                                                                                        |   | 65     | 84     | 84     | 94      | 94      | 114     | 144     |         |         |
| 303 L3 | 24 | 36 | 137.5 | 6                                                                                      | 38 | 58 | 158 | 7                                                                                        |   | 65     | 84     | 84     | 94      | 94      | 114     | 144     |         |         |
| 303 L4 | 24 | 36 | 137.5 | 6                                                                                      | 38 | 58 | 158 | 7                                                                                        |   | 65     | 84     | 84     | 94      | 94      | 114     | 144     |         |         |

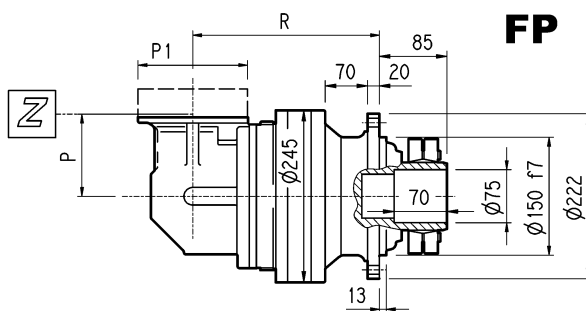
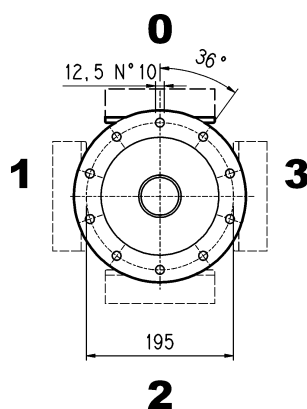
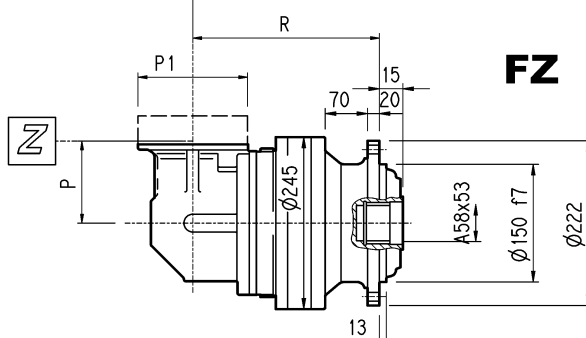
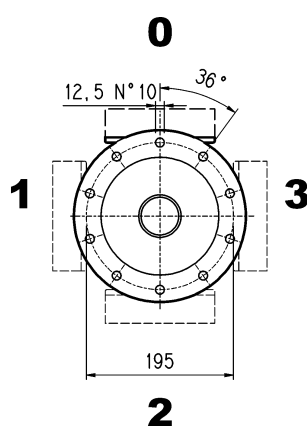
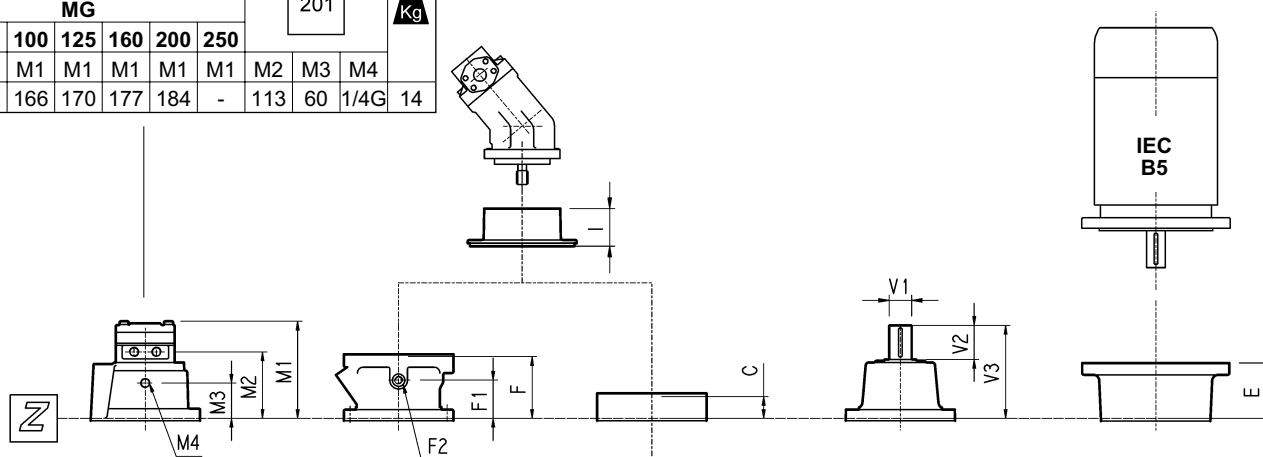
# 303R

|                 |     | Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur Hydraulique |     |     |     |     |     |     | <div>201</div> <div>Kg</div> |      |    |
|-----------------|-----|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----|
|                 |     | MG                                                                      |     |     |     |     |     |     |                                                                                                                                                                                                |      |    |
| cm <sup>3</sup> | 50  | 80                                                                      | 100 | 125 | 160 | 200 | 250 |     |                                                                                                                                                                                                |      |    |
|                 | M1  | M1                                                                      | M1  | M1  | M1  | M1  | M1  | M2  | M3                                                                                                                                                                                             | M4   |    |
| 303R2           | 156 | 162                                                                     | 166 | 170 | 177 | 184 | -   | 113 | 60                                                                                                                                                                                             | 1/4G | 14 |



# 303R

| Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     |     | <div>201</div> |    |      | <div>Kg</div> |
|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|----------------|----|------|------------------------------------------------------------------------------------------------|
| MG                                                                      |     |     |     |     |     |     |     |                |    |      |                                                                                                |
| cm <sup>3</sup>                                                         | 50  | 80  | 100 | 125 | 160 | 200 | 250 |                |    |      |                                                                                                |
|                                                                         | M1  | M1  | M1  | M1  | M1  | M1  | M1  | M2             | M3 | M4   |                                                                                                |
| 303R2                                                                   | 156 | 162 | 166 | 170 | 177 | 184 | -   | 113            | 60 | 1/4G | 14                                                                                             |



|                                                       |                                                                                                            |          |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | 3 500 Nm |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------|

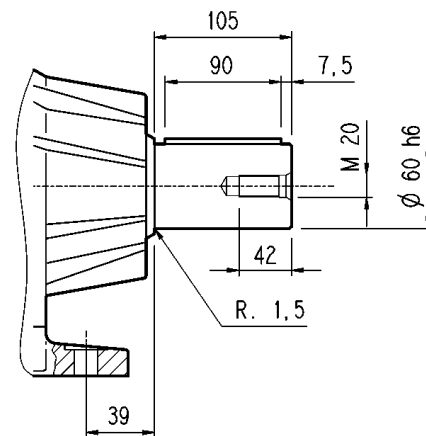
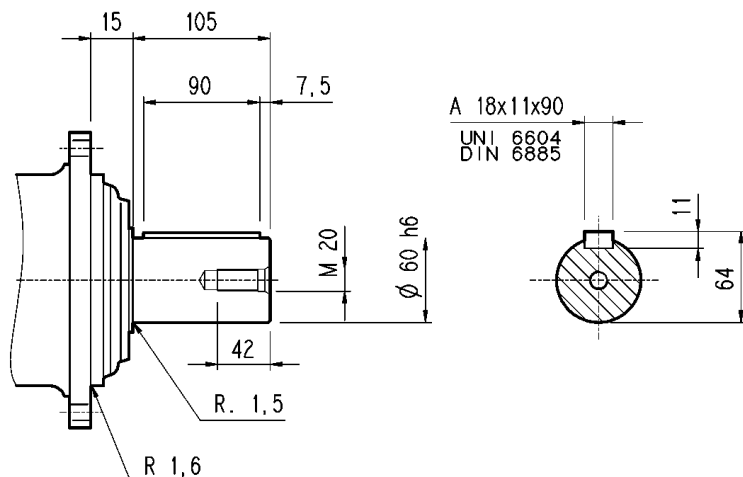
|        | R        |          |          |          | P   | P1  |  |          |          |          |  |                                       |  |  |     |       |       |                             |                                       |
|--------|----------|----------|----------|----------|-----|-----|-------------------------------------------------------------------------------------|----------|----------|----------|---------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-------|-------|-----------------------------|---------------------------------------|
|        | MZ<br>MC | FZ<br>FP | HZ<br>HC | PC<br>PZ |     |     | MZ<br>MC                                                                            | FZ<br>FP | HZ<br>HC | PC<br>PZ | C                                                                                     | Entrata<br>Input<br>Antrieb<br>Entrée |                                                                                       | I                                                                                     | F   | F1    | F2    | Tipo<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |
| 303 R2 | 217      | 217      | 242      | 257      | 140 | 186 | 51                                                                                  | 51       | 55       | 60       | 37                                                                                    | A                                     |  | 105                                                                                   | 65  | 1/4 G | 4     | A                           | 10                                    |
| 303 R3 | 270      | 270      | 295      | 310      | 122 | 186 | 49                                                                                  | 49       | 53       | 58       | 37                                                                                    | A                                     |                                                                                       | 105                                                                                   | 65  | 1/4 G | 4     | A                           | 10                                    |
| 303 R4 | 323      | 323      | 348      | 363      | 122 | 186 | 53                                                                                  | 53       | 57       | 62       | 37                                                                                    | A                                     |                                                                                       | 191                                                                                   | 105 | 65    | 1/4 G | 4                           | A                                     |

|        | V1 | V2 | V3    | Kg | V1 | V2 | V3  | Kg | E      |        |        |         |         |         |  |  |
|--------|----|----|-------|----|----|----|-----|----|--------|--------|--------|---------|---------|---------|--|--|
|        |    |    |       |    |    |    |     |    | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 |  |  |
| 303 R2 | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     |  |  |
| 303 R3 | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     |  |  |
| 303 R4 | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     |  |  |

# 303L - 303R

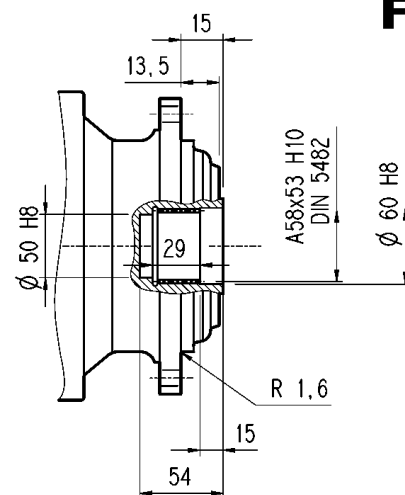
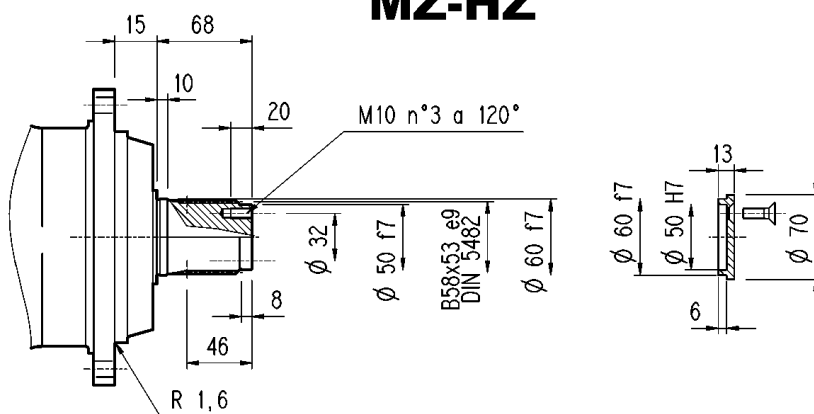
## MC-HC

## PC

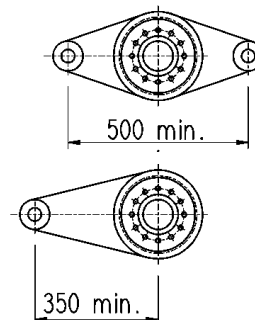
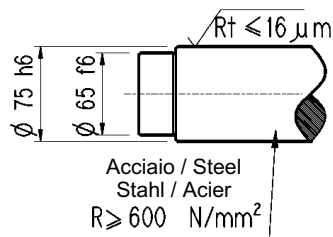
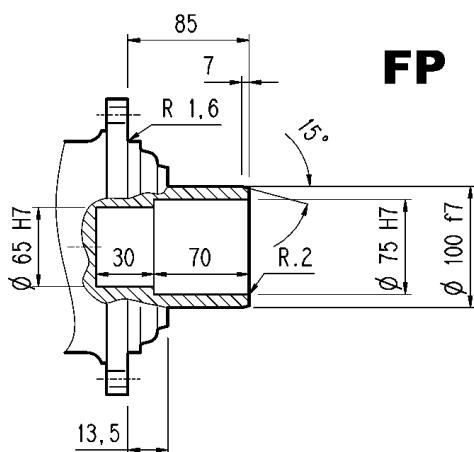


## MZ-HZ

## FZ



## FP

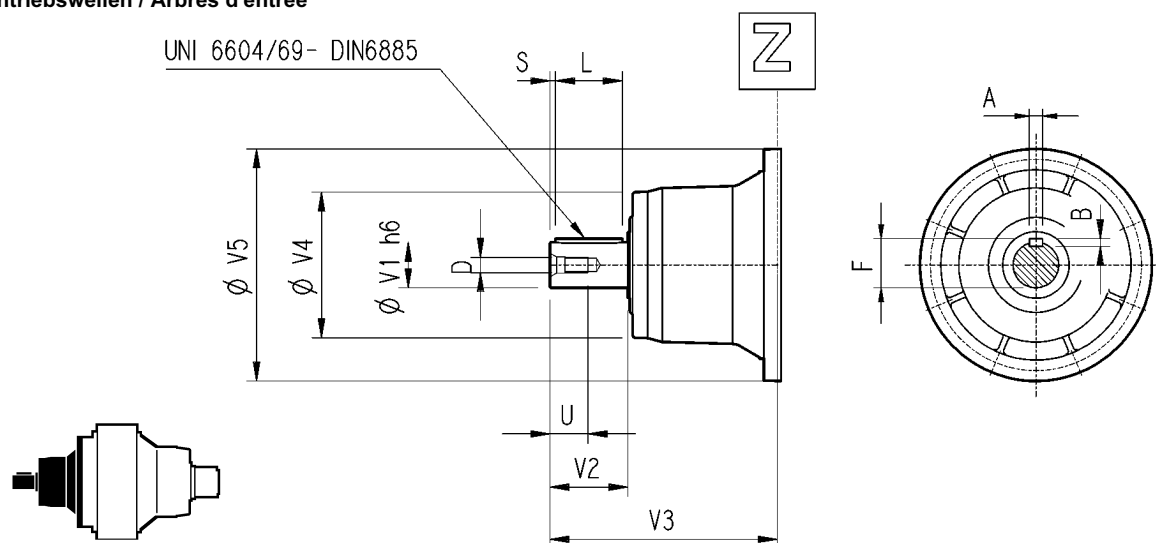


|             |                           |          |
|-------------|---------------------------|----------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 3 500 Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |          |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |          |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |          |



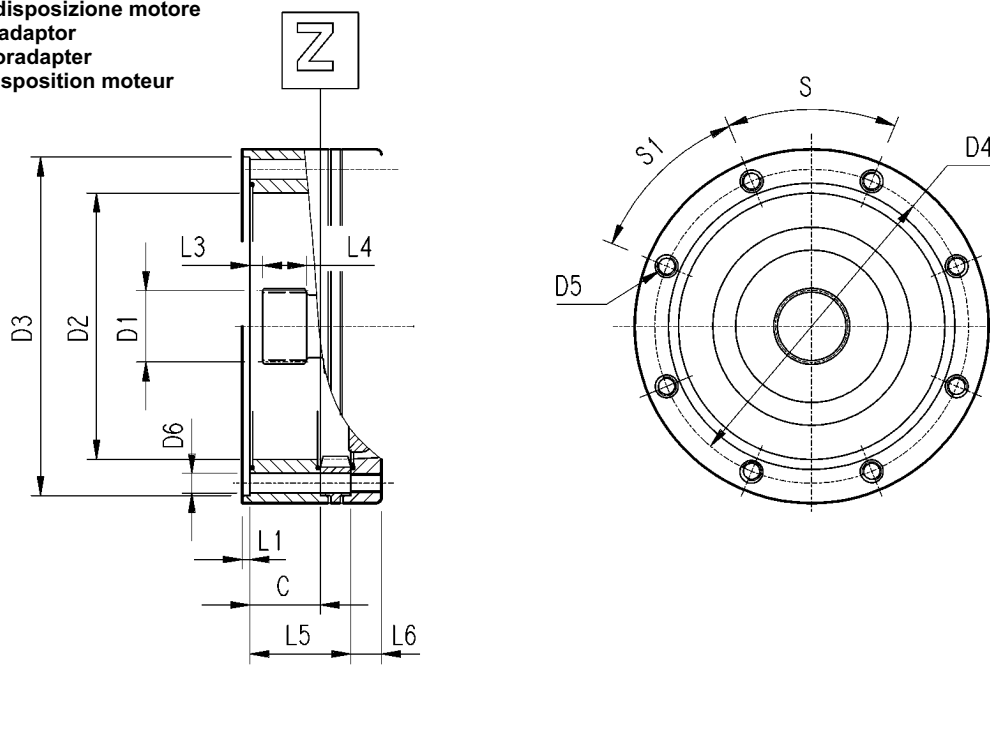
## 303L - 303R

Alberi veloci / Input shaft  
Antriebswellen / Arbres d'entrée



|              | CODE | V1 | V2 | V3    | V4  | V5  | A  | B | F    | L  | S | D   | U  |
|--------------|------|----|----|-------|-----|-----|----|---|------|----|---|-----|----|
| 303 L1       | V05B | 48 | 82 | 239   | 155 | 245 | 14 | 9 | 51.5 | 70 | 6 | M16 | 36 |
| 303 L2       | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27   | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41   | 50 | 4 | M12 | 28 |
| 303 L3       | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27   | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41   | 50 | 4 | M12 | 28 |
| 303 L4       | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27   | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41   | 50 | 4 | M12 | 28 |
| 303 R2-R3-R4 | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27   | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41   | 50 | 4 | M12 | 28 |

Dimensioni d'entrata senza predisposizione motore  
Input dimension without motor adaptor  
Maße für den Antrieb ohne Motoradapter  
Dimensions d'entrée sans prédisposition moteur



|              | C  | D1            | D2  | D3     | D4  | D5      | D6 | L1 | L2 | L3 | L4 | L5  | L6 | S   | S1  | Entrata<br>Input<br>Antrieb<br>Entrée |
|--------------|----|---------------|-----|--------|-----|---------|----|----|----|----|----|-----|----|-----|-----|---------------------------------------|
| 303 L1       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | 18 | 9  | 18 | 0   | 0  | 45° | 45° | A                                     |
| 303 L2       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 53  | 18 | 45° | 45° | A                                     |
| 303 L3       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 106 | 18 | 45° | 45° | A                                     |
| 303 L4       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 159 | 18 | 45° | 45° | A                                     |
| 303 R2-R3-R4 | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 37  | 18 | 45° | 45° | A                                     |

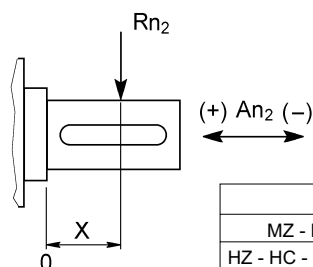
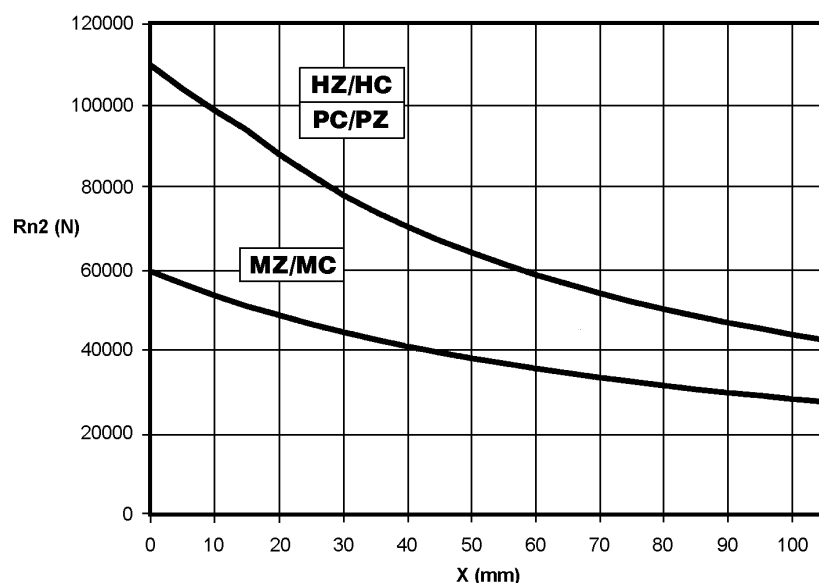
## 303L - 303R

Carichi radiali ed assiali ammissibili sull'albero lento per un valore di  $Fh_2 : n_2 \cdot h = 10\,000$

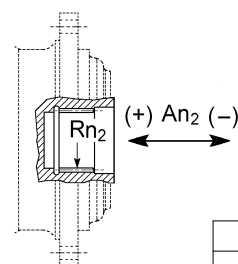
Permissible radial and axial loads on output shaft with  $Fh_2 : n_2 \cdot h = 10\,000$

An der Ausgangswelle zulässige Radiallasten und Axialkräfte für einen Wert von  $Fh_2 : n_2 \cdot h = 10\,000$

Charges radiales et axiales admissibles sur l'arbre lent pour une valeur de  $Fh_2 : n_2 \cdot h = 10\,000$



|                   | An2 (+) | An2 (-) |
|-------------------|---------|---------|
| MZ - MC           | 55 000  | 44 000  |
| HZ - HC - PC - PZ | 55 000  | 44 000  |



|    | Rn2    | An2 (+/-) |
|----|--------|-----------|
| FZ | 24 000 | 25 000    |

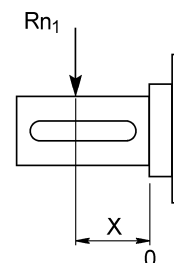
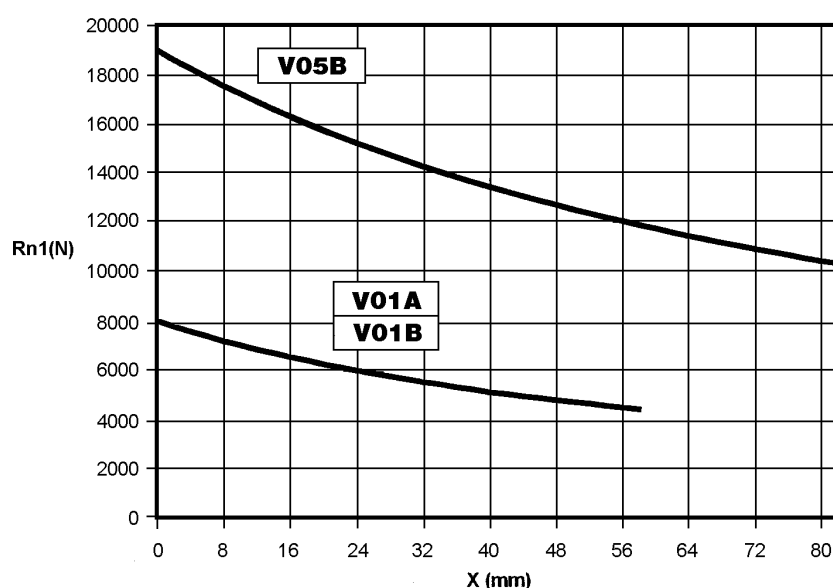
|                                                                                                                                                                                                                                                 |                                      |                   |        |        |        |         |         |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------|--------|--------|--------|---------|---------|-----------|
| Fattore fh <sub>2</sub> correttivo per carichi sugli alberi<br>Load corrective factor fh <sub>2</sub> on shafts<br>Korrektionsfaktor fh <sub>2</sub> für wellenbelastungen<br>Facteur de corréction fh <sub>2</sub> pour charges sur les arbres | Fh <sub>2</sub> = n <sub>2</sub> · h |                   | 10 000 | 25 000 | 50 000 | 100 000 | 500 000 | 1 000 000 |
|                                                                                                                                                                                                                                                 | fh <sub>2</sub>                      | MZ - MC - FZ      | 1      | 0.74   | 0.58   | 0.46    | 0.27    | 0.21      |
|                                                                                                                                                                                                                                                 |                                      | HZ - HC - PC - PZ | 1      | 0.76   | 0.61   | 0.50    | 0.31    | 0.25      |

Carichi radiali ammissibili sull'albero veloce per un valore di  $Fh_1 : n_1 \cdot h = 250\,000$

Permissible radial loads on input shaft with  $Fh_1 : n_1 \cdot h = 250\,000$

An der Antriebswelle zulässige Radiallasten für einen Wert von  $Fh_1 : n_1 \cdot h = 250\,000$

Charges radiales admises sur l'arbre d'entrée pour une valeur de  $Fh_1 : n_1 \cdot h = 250\,000$



| Fattore $fh_1$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_1$ on shafts<br>Korrektionsfaktor $fh_1$ für wellenbelastungen<br>Facteur de correction $fh_1$ pour charges sur les arbres | $Fh_1 = n_1 \cdot h$ |         |         |           |           |           |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|---------|-----------|-----------|-----------|------------|
|                                                                                                                                                                                                             | $fh_1$               | 250 000 | 500 000 | 1 000 000 | 2 000 000 | 5 000 000 | 10 000 000 |
|                                                                                                                                                                                                             |                      | 1       | 0.79    | 0.63      | 0.50      | 0.37      | 0.29       |

# 305L

**M<sub>2</sub> = 5000 Nm**

|  | i     | M <sub>n2</sub> [Nm]        |                             |                             |                              |                              |                                | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|-----------------------------------------------------------------------------------|-------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                   | 1:    | n <sub>2</sub> ·h<br>10 000 | n <sub>2</sub> ·h<br>25 000 | n <sub>2</sub> ·h<br>50 000 | n <sub>2</sub> ·h<br>100 000 | n <sub>2</sub> ·h<br>500 000 | n <sub>2</sub> ·h<br>1 000 000 | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>L1</b>                                                                         | 3.60  | 4 700                       | 4 450                       | 4 300                       | 4 200                        | 3 750                        | 3 050                          | 60             | 13             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                   | 4.25  | 5 800                       | 5 500                       | 5 300                       | 5 200                        | 3 700                        | 3 000                          | 60             | 13             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                   | 5.33  | 5 600                       | 4 900                       | 4 400                       | 4 400                        | 3 600                        | 2 950                          | 60             | 13             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                   | 6.20  | 4 600                       | 3 950                       | 3 600                       | 3 600                        | 3 550                        | 2 900                          | 60             | 13             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                   | 7.50  | 3 800                       | 3 300                       | 3 100                       | 3 100                        | 3 000                        | 2 400                          | 60             | 13             | 1 800                | 3 800                | 630            | 5E                                                                                  |
| <b>L2</b>                                                                         | 12.5  | 4 700                       | 4 450                       | 4 300                       | 4 200                        | 3 250                        | 2 650                          | 30             | 9              | 2 000                | 4 000                | 400            | 4K                                                                                  |
|                                                                                   | 15.3  | 4 700                       | 4 450                       | 4 300                       | 4 200                        | 3 250                        | 2 650                          | 30             | 9              | 2 000                | 4 000                | 330            | 4H                                                                                  |
|                                                                                   | 18.1  | 5 800                       | 5 500                       | 5 300                       | 5 200                        | 3 650                        | 2 950                          | 30             | 9              | 2 000                | 4 000                | 400            | 4K                                                                                  |
|                                                                                   | 20.8  | 4 700                       | 4 450                       | 4 300                       | 4 200                        | 3 100                        | 2 500                          | 30             | 9              | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 22.7  | 5 600                       | 4 900                       | 4 400                       | 4 400                        | 3 600                        | 2 950                          | 30             | 9              | 2 000                | 4 000                | 330            | 4H                                                                                  |
|                                                                                   | 24.5  | 5 500                       | 5 400                       | 5 300                       | 5 200                        | 3 450                        | 2 800                          | 30             | 9              | 2 000                | 4 000                | 330            | 4H                                                                                  |
|                                                                                   | 26.4  | 4 600                       | 3 950                       | 3 600                       | 3 600                        | 3 550                        | 2 900                          | 23             | 9              | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 30.8  | 5 600                       | 4 900                       | 4 400                       | 4 400                        | 3 600                        | 2 950                          | 24             | 9              | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 35.8  | 4 600                       | 3 950                       | 3 600                       | 3 600                        | 3 550                        | 2 900                          | 17.0           | 9              | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 38.4  | 5 600                       | 4 900                       | 4 400                       | 4 400                        | 3 600                        | 2 900                          | 19.8           | 9              | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 44.6  | 4 600                       | 3 950                       | 3 600                       | 3 600                        | 3 550                        | 2 900                          | 14.1           | 9              | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 54.0  | 3 800                       | 3 300                       | 3 100                       | 3 100                        | 3 000                        | 2 400                          | 10.0           | 9              | 2 000                | 4 000                | 100            | 4B                                                                                  |
| <b>L3</b>                                                                         | 43.6  | 4 700                       | 4 450                       | 4 300                       | 4 200                        | 3 250                        | 2 650                          | 17.3           | 7.5            | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 53.4  | 4 700                       | 4 450                       | 4 300                       | 4 200                        | 3 250                        | 2 650                          | 14.3           | 7.5            | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 63.1  | 5 800                       | 5 350                       | 5 300                       | 5 200                        | 3 650                        | 3 000                          | 14.6           | 7.5            | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 72.3  | 4 700                       | 4 450                       | 4 300                       | 4 200                        | 3 250                        | 2 650                          | 10.7           | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 77.2  | 5 800                       | 5 500                       | 5 300                       | 5 200                        | 3 650                        | 2 950                          | 12.5           | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 90.2  | 4 700                       | 4 450                       | 4 300                       | 4 200                        | 3 250                        | 2 650                          | 8.7            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 105   | 5 800                       | 5 500                       | 5 300                       | 5 200                        | 3 650                        | 2 950                          | 9.4            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 113   | 4 600                       | 3 950                       | 3 600                       | 3 600                        | 3 550                        | 2 900                          | 6.7            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 124   | 4 600                       | 3 950                       | 3 600                       | 3 600                        | 3 550                        | 2 900                          | 6.2            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 141   | 5 500                       | 5 350                       | 5 300                       | 5 200                        | 3 450                        | 2 800                          | 6.6            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 152   | 4 600                       | 3 950                       | 3 600                       | 3 600                        | 3 550                        | 2 900                          | 5.2            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 164   | 5 600                       | 4 900                       | 4 400                       | 4 400                        | 3 600                        | 2 950                          | 6.0            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 178   | 5 600                       | 4 900                       | 4 400                       | 4 400                        | 3 600                        | 2 950                          | 5.6            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 190   | 4 600                       | 3 950                       | 3 600                       | 3 600                        | 3 550                        | 2 900                          | 4.3            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 220   | 4 750                       | 4 750                       | 4 750                       | 4 750                        | 3 050                        | 2 500                          | 3.7            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 258   | 4 600                       | 3 950                       | 3 600                       | 3 600                        | 3 550                        | 2 900                          | 3.4            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 276   | 5 600                       | 4 900                       | 4 400                       | 4 400                        | 3 600                        | 2 900                          | 3.7            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 312   | 3 800                       | 3 300                       | 3 100                       | 3 100                        | 3 000                        | 2 400                          | 2.4            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 389   | 3 800                       | 3 300                       | 3 100                       | 3 100                        | 3 000                        | 2 400                          | 2.0            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
| <b>L4</b>                                                                         | 413   | 5 600                       | 4 900                       | 4 400                       | 4 400                        | 3 600                        | 2 900                          | 4.0            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 446   | 5 800                       | 5 500                       | 5 300                       | 5 200                        | 3 650                        | 2 950                          | 4.0            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 492   | 5 500                       | 5 350                       | 5 300                       | 5 200                        | 3 450                        | 2 800                          | 3.2            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 556   | 5 800                       | 5 500                       | 5 300                       | 5 200                        | 3 650                        | 2 950                          | 3.2            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 649   | 4 700                       | 4 450                       | 4 300                       | 4 200                        | 3 250                        | 2 650                          | 2.2            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 718   | 4 600                       | 3 950                       | 3 600                       | 3 600                        | 3 550                        | 2 900                          | 2.2            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 816   | 5 500                       | 5 350                       | 5 300                       | 5 200                        | 3 450                        | 2 800                          | 2.2            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 896   | 4 600                       | 3 950                       | 3 600                       | 3 600                        | 3 550                        | 2 900                          | 1.9            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 018 | 5 500                       | 5 350                       | 5 300                       | 5 200                        | 3 450                        | 2 800                          | 1.7            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 098 | 4 600                       | 3 950                       | 3 600                       | 3 600                        | 3 550                        | 2 900                          | 1.6            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 278 | 5 600                       | 4 900                       | 4 400                       | 4 400                        | 3 600                        | 2 950                          | 1.4            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 370 | 4 600                       | 3 950                       | 3 600                       | 3 600                        | 3 550                        | 2 900                          | 1.3            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 586 | 4 750                       | 4 750                       | 4 750                       | 4 750                        | 3 050                        | 2 500                          | 0.88           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 854 | 4 600                       | 3 950                       | 3 600                       | 3 600                        | 3 550                        | 2 900                          | 0.96           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 991 | 5 600                       | 4 900                       | 4 400                       | 4 400                        | 3 600                        | 2 900                          | 0.88           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 243 | 3 800                       | 3 300                       | 3 100                       | 3 100                        | 3 000                        | 2 400                          | 0.71           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 799 | 3 800                       | 3 300                       | 3 100                       | 3 100                        | 3 000                        | 2 400                          | 0.59           | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

# M<sub>2</sub> = 5000 Nm

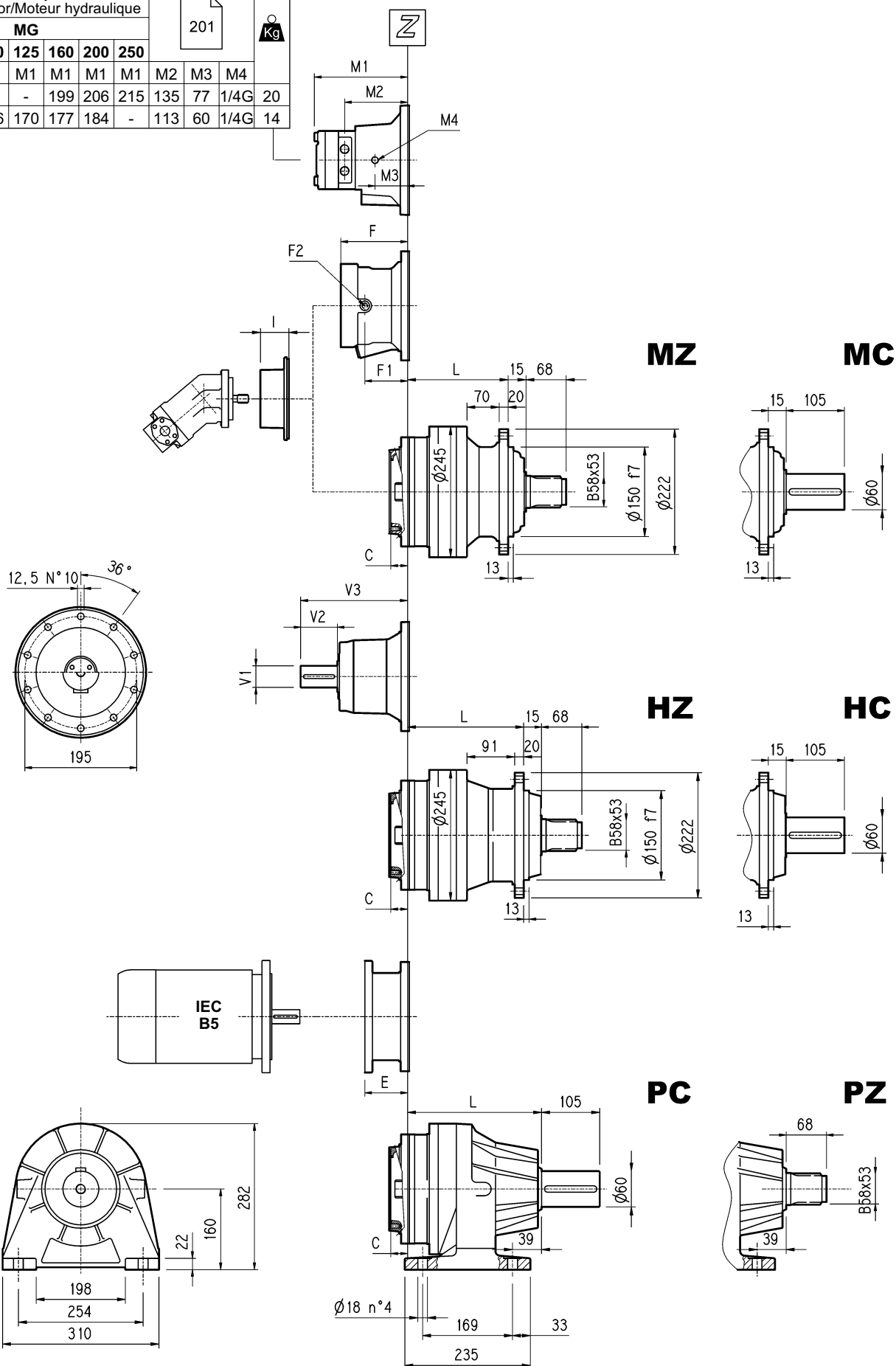
# 305R

|  | i    | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|----------------------------------------------------------------------------------|------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                  |      | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h |                |                |                      |                      |                |                                                                                     |
|                                                                                  | 1:   | 10 000               | 25 000            | 50 000            | 100 000           | 500 000           | 1 000 000         | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>R2</b>                                                                        | 9.23 | 4 650                | 4 050             | 3 600             | 3 200             | 2 000             | 1 600             | 35             | 18             | 1 800                | 3 800                | 440            | 4L                                                                                  |
|                                                                                  | 10.9 | 5 300                | 4 650             | 4 150             | 3 600             | 2 200             | 1 800             | 35             | 18             | 1 800                | 3 800                | 440            | 4L                                                                                  |
|                                                                                  | 13.7 | 5 600                | 4 900             | 4 400             | 4 200             | 2 600             | 2 100             | 35             | 18             | 1 800                | 3 800                | 440            | 4L                                                                                  |
|                                                                                  | 15.9 | 4 600                | 3 950             | 3 600             | 3 600             | 2 900             | 2 350             | 35             | 18             | 1 800                | 3 800                | 330            | 4H                                                                                  |
|                                                                                  | 19.2 | 3 800                | 3 300             | 3 100             | 3 100             | 3 000             | 2 400             | 27             | 18             | 1 800                | 3 800                | 260            | 4F                                                                                  |
| <b>R3</b>                                                                        | 25.7 | 4 150                | 4 150             | 4 150             | 4 150             | 2 600             | 2 100             | 15.0           | 14             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 31.5 | 4 700                | 4 450             | 4 300             | 4 200             | 3 000             | 2 450             | 15.0           | 14             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 37.1 | 5 800                | 5 500             | 5 300             | 5 200             | 3 400             | 2 750             | 15.0           | 14             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 42.6 | 4 700                | 4 450             | 4 300             | 4 200             | 3 100             | 2 500             | 15.0           | 14             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 46.6 | 5 600                | 4 900             | 4 400             | 4 400             | 3 600             | 2 950             | 15.0           | 14             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 50.3 | 5 500                | 5 350             | 5 300             | 5 200             | 3 450             | 2 800             | 15.0           | 14             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 54.2 | 4 600                | 3 950             | 3 600             | 3 600             | 3 550             | 2 900             | 12.4           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 63.1 | 5 600                | 4 900             | 4 400             | 4 400             | 3 600             | 2 950             | 13.4           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 73.3 | 4 600                | 3 950             | 3 600             | 3 600             | 3 550             | 2 900             | 9.6            | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 78.7 | 5 600                | 4 900             | 4 400             | 4 400             | 3 600             | 2 900             | 11.1           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 91.5 | 4 600                | 3 950             | 3 600             | 3 600             | 3 550             | 2 900             | 8.0            | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 111  | 3 800                | 3 300             | 3 100             | 3 100             | 3 000             | 2 400             | 5.6            | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
| <b>R4</b>                                                                        | 129  | 5 800                | 5 400             | 5 300             | 5 200             | 3 650             | 3 000             | 12.3           | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 148  | 4 700                | 4 450             | 4 300             | 4 200             | 3 250             | 2 650             | 9.1            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 158  | 5 800                | 5 500             | 5 300             | 5 200             | 3 650             | 2 950             | 10.6           | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 185  | 4 700                | 4 450             | 4 300             | 4 200             | 3 250             | 2 650             | 7.4            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 214  | 5 800                | 5 500             | 5 300             | 5 200             | 3 650             | 2 950             | 7.9            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 231  | 4 600                | 3 950             | 3 600             | 3 600             | 3 550             | 2 900             | 5.8            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 255  | 4 600                | 3 950             | 3 600             | 3 600             | 3 550             | 2 900             | 5.3            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 290  | 5 500                | 5 400             | 5 300             | 5 200             | 3 450             | 2 800             | 5.7            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 313  | 4 600                | 3 950             | 3 600             | 3 600             | 3 550             | 2 900             | 4.5            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 336  | 5 600                | 4 900             | 4 400             | 4 400             | 3 600             | 2 900             | 4.9            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 364  | 5 600                | 4 900             | 4 400             | 4 400             | 3 600             | 2 950             | 4.8            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 390  | 4 600                | 3 950             | 3 600             | 3 600             | 3 550             | 2 900             | 3.7            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 452  | 4 750                | 4 750             | 4 750             | 4 750             | 3 050             | 2 500             | 3.1            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 528  | 4 600                | 3 950             | 3 600             | 3 600             | 3 550             | 2 900             | 2.5            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 567  | 5 600                | 4 900             | 4 400             | 4 400             | 3 600             | 2 900             | 3.1            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 639  | 3 800                | 3 300             | 3 100             | 3 100             | 3 000             | 2 400             | 2.0            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 797  | 3 800                | 3 300             | 3 100             | 3 100             | 3 000             | 2 400             | 1.7            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

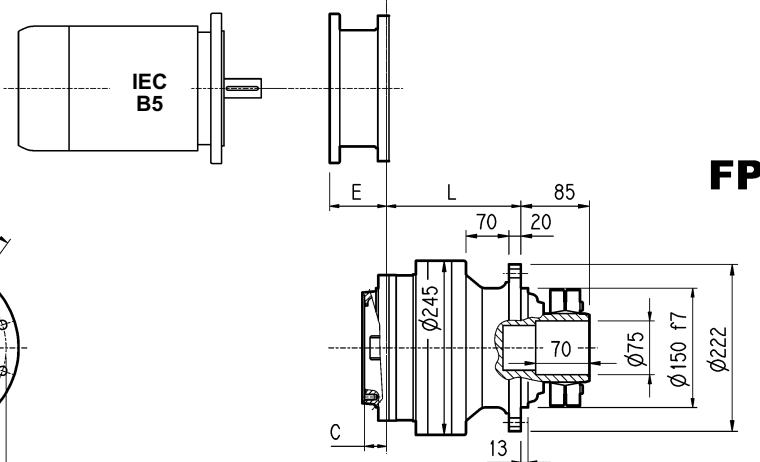
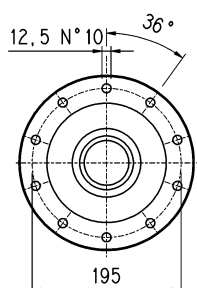
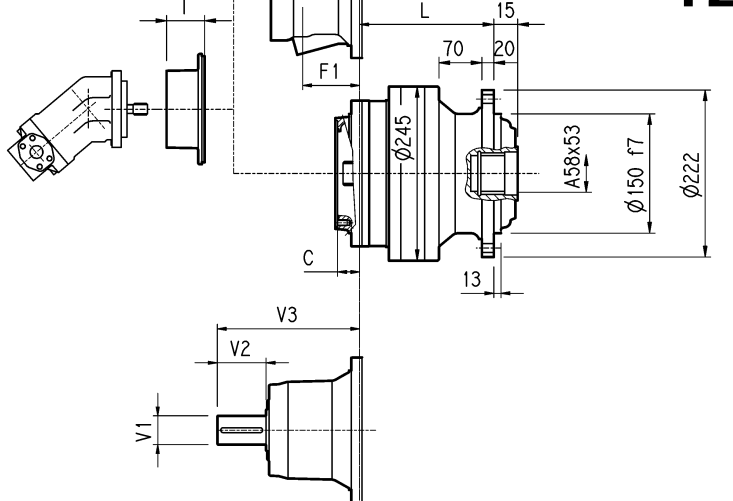
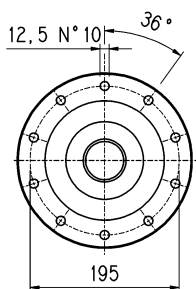
# 305L

|                 | Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     | <div><div></div>201</div> |    |      | <div><div></div>Kg</div> |
|-----------------|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|---------------------------|----|------|--------------------------|
|                 | MG                                                                      |     |     |     |     |     |     |                           |    |      |                          |
| cm <sup>3</sup> | 50                                                                      | 80  | 100 | 125 | 160 | 200 | 250 |                           |    |      |                          |
|                 | M1                                                                      | M1  | M1  | M1  | M1  | M1  | M1  | M2                        | M3 | M4   |                          |
| 305L1           | -                                                                       | -   | -   | -   | 199 | 206 | 215 | 135                       | 77 | 1/4G | 20                       |
| 305L2           | 156                                                                     | 162 | 166 | 170 | 177 | 184 | -   | 113                       | 60 | 1/4G | 14                       |



# 305L

| Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     |     |     |    |      |    |
|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|----|------|----|
| MG                                                                      |     |     |     |     |     |     |     | 201 |    | Kg   |    |
| cm <sup>3</sup>                                                         | 50  | 80  | 100 | 125 | 160 | 200 | 250 | M2  | M3 | M4   |    |
|                                                                         | M1  | M1  | M1  | M1  | M1  | M1  | M1  | M2  | M3 | M4   |    |
| <b>305L1</b>                                                            | -   | -   | -   | -   | 199 | 206 | 215 | 135 | 77 | 1/4G | 20 |
| <b>305L2</b>                                                            | 156 | 162 | 166 | 170 | 177 | 184 | -   | 113 | 60 | 1/4G | 14 |



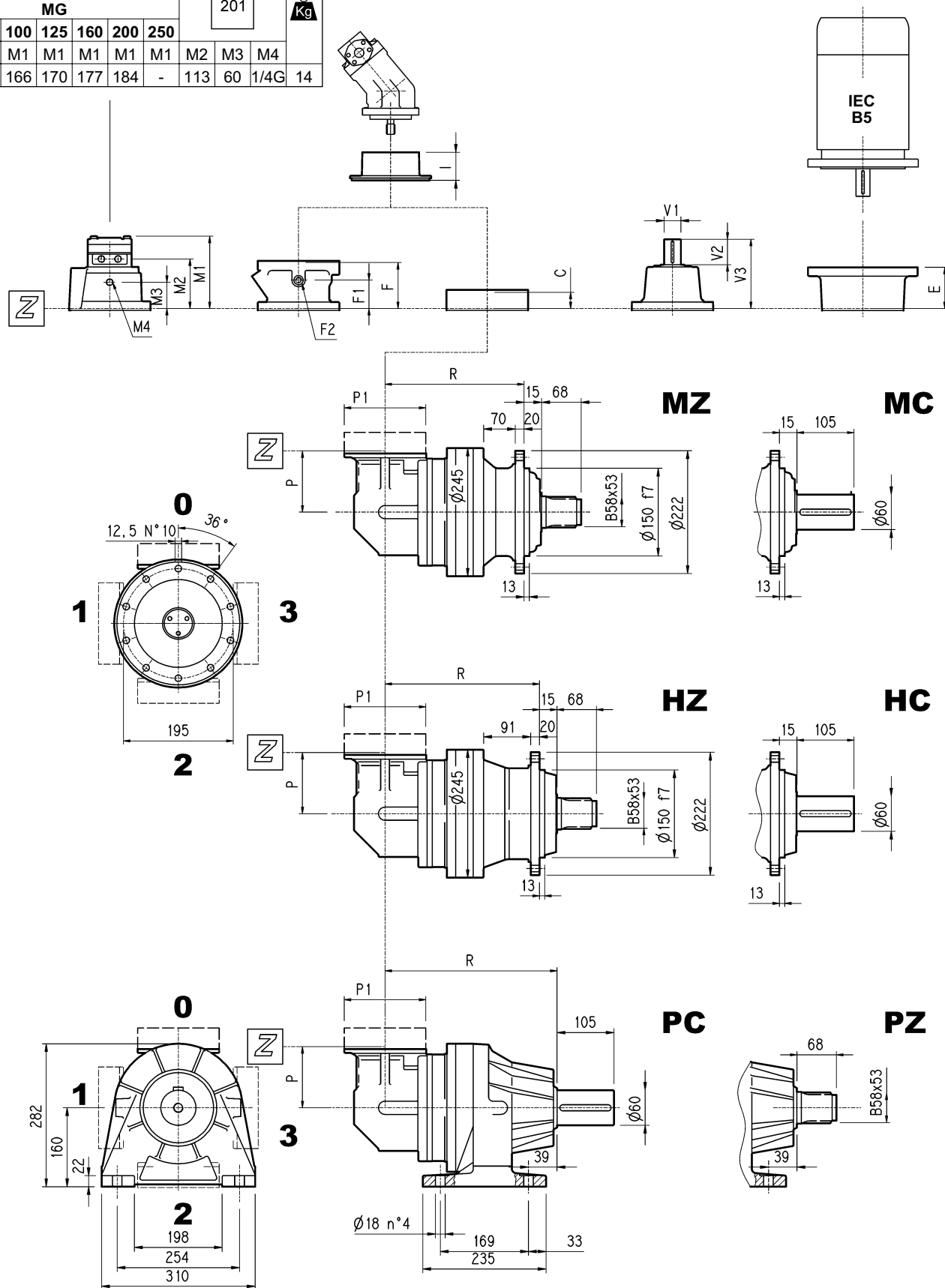
|             |                           |          |
|-------------|---------------------------|----------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 7 000 Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |          |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |          |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |          |

|        | L     |       |       |       |  |       |       |       |  |                                    |  |  |     |       |                             |                                    |                                                                                       |
|--------|-------|-------|-------|-------|-------------------------------------------------------------------------------------|-------|-------|-------|-------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-------|-----------------------------|------------------------------------|---------------------------------------------------------------------------------------|
|        | MZ MC | FZ FP | HZ HC | PC PZ | MZ MC                                                                               | FZ FP | HZ HC | PC PZ | C                                                                                   | Entrata Input<br>Antrieb<br>Entrée | I                                                                                     | F                                                                                     | F1  | F2    | Tipo<br>Type<br>Typ<br>Type | Entrata Input<br>Antrieb<br>Entrée |  |
| 305 L1 | 143   | 143   | 168   | 183   | 36                                                                                  | 36    | 40    | 45    | 37                                                                                  | A                                  |  | 145                                                                                   | 95  | 1/4 G | 5                           | A                                  | 16                                                                                    |
| 305 L2 | 208   | 208   | 233   | 248   | 43                                                                                  | 43    | 47    | 52    | 37                                                                                  | A                                  |                                                                                       | 105                                                                                   | 65  | 1/4 G | 4                           | A                                  | 10                                                                                    |
| 305 L3 | 261   | 261   | 286   | 301   | 47                                                                                  | 47    | 51    | 56    | 37                                                                                  | A                                  |                                                                                       | 105                                                                                   | 65  | 1/4 G | 4                           | A                                  | 10                                                                                    |
| 305 L4 | 314   | 314   | 339   | 354   | 51                                                                                  | 51    | 55    | 60    | 37                                                                                  | A                                  |                                                                                       | 191                                                                                   | 105 | 65    | 1/4 G                       | 4                                  | A                                                                                     |

|               | V1 | V2 | V3    | Kg | V1 | V2 | V3  | Kg | E      |        |        |         |         |         |         |         |         |  |
|---------------|----|----|-------|----|----|----|-----|----|--------|--------|--------|---------|---------|---------|---------|---------|---------|--|
|               |    |    |       |    |    |    |     |    | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 | IEC 200 |  |
| <b>305 L1</b> | 48 | 82 | 239   | 15 |    |    |     |    |        |        |        |         |         | 114     | 144     | 144     | 174     |  |
| <b>305 L2</b> | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     | 144     |         |         |  |
| <b>305 L3</b> | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     | 144     |         |         |  |
| <b>305 L4</b> | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     | 144     |         |         |  |

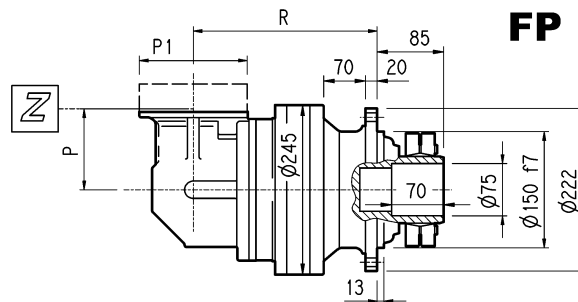
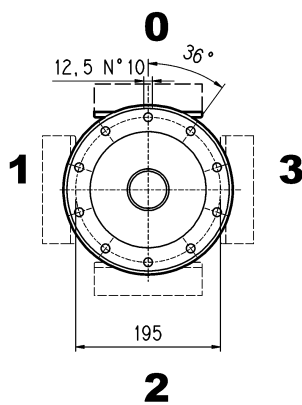
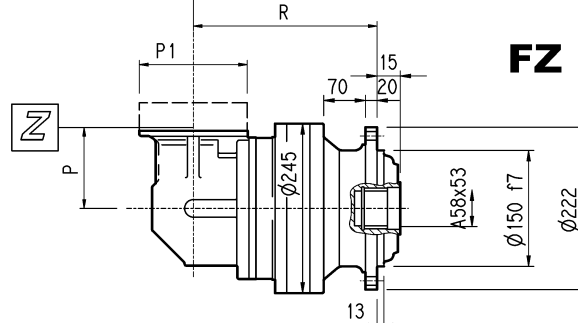
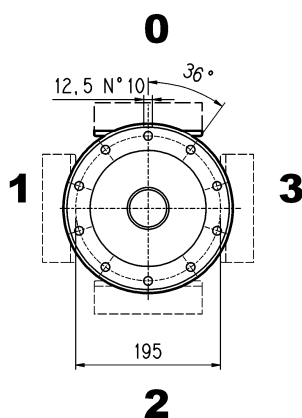
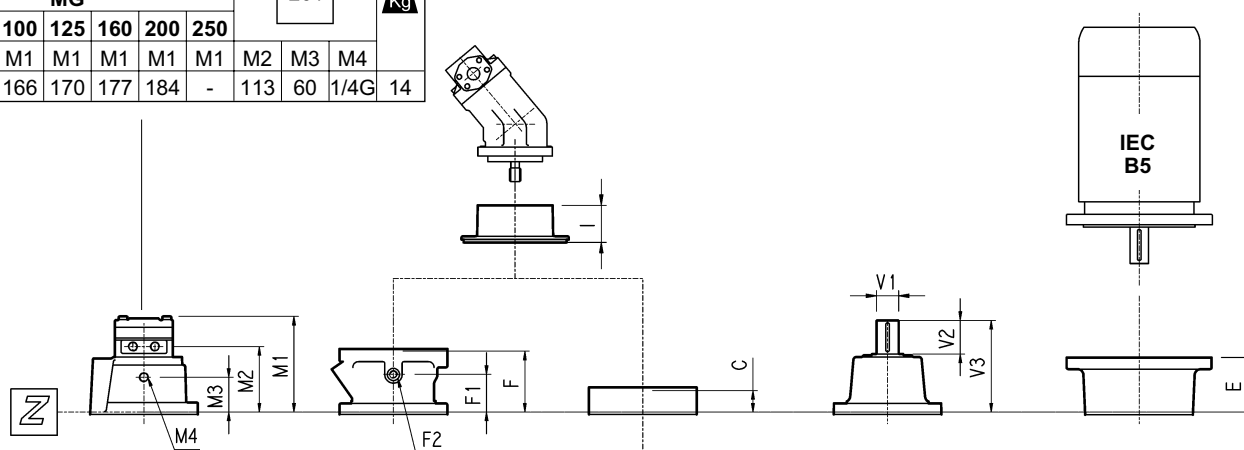
# 305R

|                 |                                                                         |     |     |     |     |     |     |                                                                                       |    |      |                                                                                      |
|-----------------|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|---------------------------------------------------------------------------------------|----|------|--------------------------------------------------------------------------------------|
|                 | Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     |  201 |    |      |  Kg |
|                 | MG                                                                      |     |     |     |     |     |     |                                                                                       |    |      |                                                                                      |
| cm <sup>3</sup> | 50                                                                      | 80  | 100 | 125 | 160 | 200 | 250 |                                                                                       |    |      |                                                                                      |
|                 | M1                                                                      | M1  | M1  | M1  | M1  | M1  | M1  | M2                                                                                    | M3 | M4   |                                                                                      |
| <b>305R2</b>    | 156                                                                     | 162 | 166 | 170 | 177 | 184 | -   | 113                                                                                   | 60 | 1/4G | 14                                                                                   |



# 305R

| Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     |     |     |    |      |    |
|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|----|------|----|
| MG                                                                      |     |     |     |     |     |     |     |     |    |      |    |
| cm <sup>3</sup>                                                         | 50  | 80  | 100 | 125 | 160 | 200 | 250 |     |    |      |    |
|                                                                         | M1  | M1  | M1  | M1  | M1  | M1  | M1  | M2  | M3 | M4   |    |
| 305R2                                                                   | 156 | 162 | 166 | 170 | 177 | 184 | -   | 113 | 60 | 1/4G | 14 |



|                                                       |                                                                                                            |          |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | 7 000 Nm |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------|

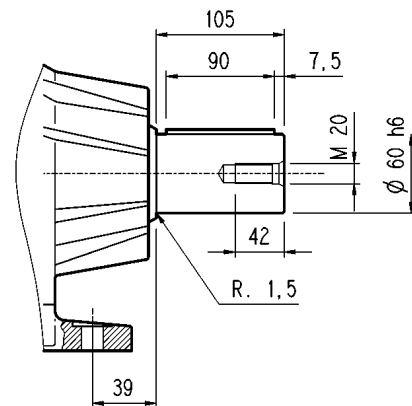
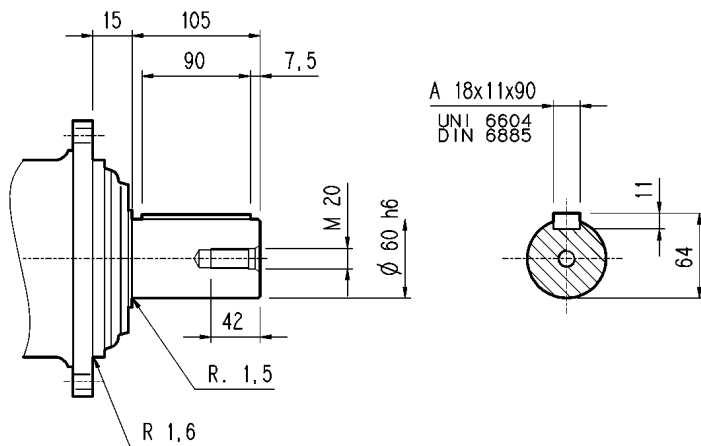
|        | R        |          |          |          | P   | P1  |  |          |          |          |  |                                       |  |  |  |       |                             |                                       |                                                                                       |    |
|--------|----------|----------|----------|----------|-----|-----|-------------------------------------------------------------------------------------|----------|----------|----------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------|-----------------------------|---------------------------------------|---------------------------------------------------------------------------------------|----|
|        | MZ<br>MC | FZ<br>FP | HZ<br>HC | PC<br>PZ |     |     | MZ<br>MC                                                                            | FZ<br>FP | HZ<br>HC | PC<br>PZ | C                                                                                   | Entrata<br>Input<br>Antrieb<br>Entrée | I                                                                                     | F                                                                                     | F1                                                                                    | F2    | Typo<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |  |    |
| 305 R2 | 235      | 235      | 260      | 275      | 140 | 186 | 56                                                                                  | 56       | 60       | 65       | 37                                                                                  | A                                     |  | 191                                                                                   | 105                                                                                   | 65    | 1/4 G                       | 4                                     | A                                                                                     | 10 |
| 305 R3 | 300      | 300      | 325      | 340      | 122 | 186 | 57                                                                                  | 57       | 61       | 66       | 37                                                                                  | A                                     |                                                                                       | 105                                                                                   | 65                                                                                    | 1/4 G | 4                           | A                                     | 10                                                                                    |    |
| 305 R4 | 353      | 353      | 378      | 393      | 122 | 186 | 61                                                                                  | 61       | 65       | 70       | 37                                                                                  | A                                     |                                                                                       | 105                                                                                   | 65                                                                                    | 1/4 G | 4                           | A                                     | 10                                                                                    |    |

|        | V1 | V2 | V3    | Kg | V1 | V2 | V3  | Kg | E      |        |        |         |         |         |  |  |
|--------|----|----|-------|----|----|----|-----|----|--------|--------|--------|---------|---------|---------|--|--|
|        |    |    |       |    |    |    |     |    | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 |  |  |
| 305 R2 | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     |  |  |
| 305 R3 | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     |  |  |
| 305 R4 | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     |  |  |

## 305L - 305R

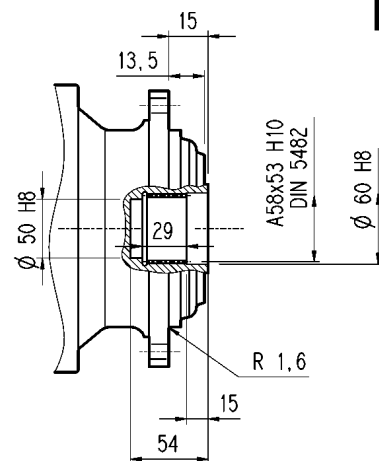
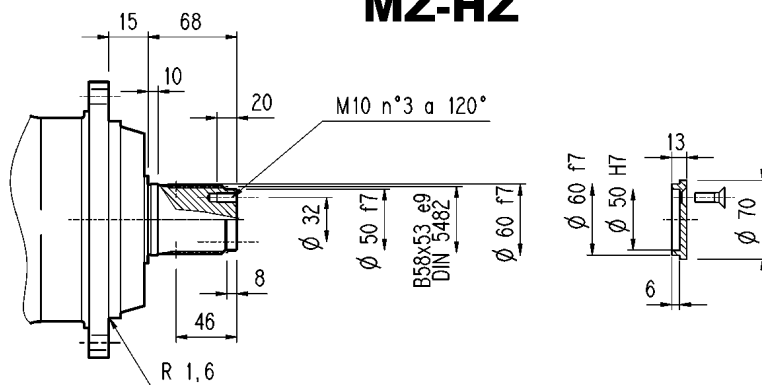
## MC-HC

## PC

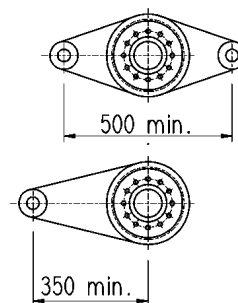
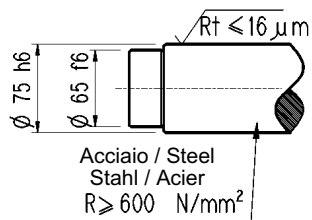
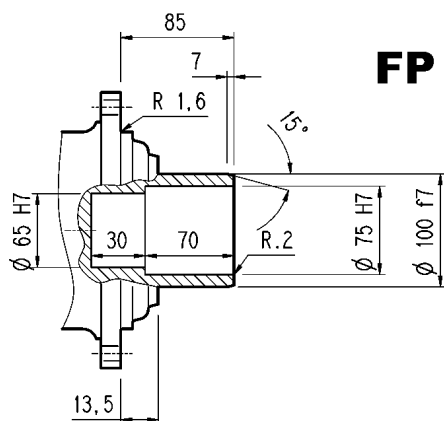


## MZ-HZ

## FZ



## FP

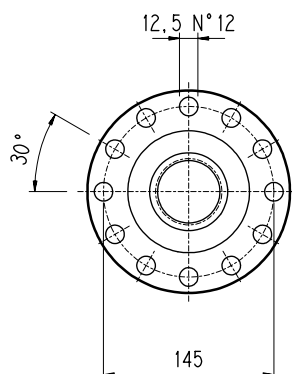
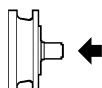


|                                                       |                                                                                                            |          |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | 7 000 Nm |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------|

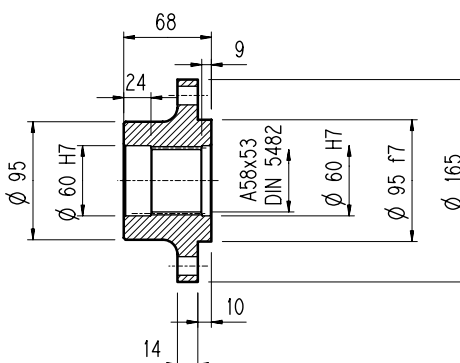
**Flangia / Flange**  
**Flansch / Brides**

**305L - 305R**

**W0A**

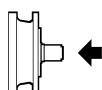


Materiale : Acciaio C40  
Material : Steel C40  
Material : Stahl C40  
Màterial : Acier C40

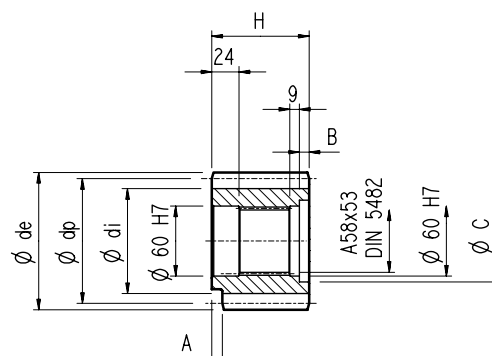


**Pignoni per rotazione / Output pinions**  
**Ritzel / Pignons**

**P...**



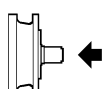
| Codice Code | m  | z  | x     | dp  | di   | de    | H  | A  | B  | C  | ★ |
|-------------|----|----|-------|-----|------|-------|----|----|----|----|---|
| PCL1        | 5  | 19 | 0     | 95  | 82   | 104   | 77 | 12 | 9  | 72 | ■ |
| PCL2        | 5  | 19 | 0     | 95  | 82   | 104   | 68 | 0  | 0  | 0  | ■ |
| PCM         | 5  | 20 | 0     | 100 | 87.5 | 110   | 68 | 18 | 0  | 0  | □ |
| PCP         | 5  | 22 | 0     | 110 | 97.5 | 120   | 68 | 18 | 0  | 0  | □ |
| PDE         | 6  | 14 | 0.500 | 84  | 75   | 99.6  | 68 | 0  | 0  | 0  | ■ |
| PDI         | 6  | 18 | 0.500 | 108 | 99   | 123.6 | 68 | 0  | 0  | 0  | ■ |
| PDM         | 6  | 20 | 0.833 | 120 | 115  | 140   | 68 | 0  | 0  | 0  | ■ |
| PFD         | 8  | 13 | 0.675 | 104 | 95   | 127.6 | 68 | 0  | 0  | 0  | □ |
| PFE1        | 8  | 14 | 0     | 112 | 92   | 126   | 68 | 0  | 0  | 0  | □ |
| PFE2        | 8  | 14 | 0     | 112 | 92   | 126   | 80 | 0  | 12 | 72 | □ |
| PFF         | 8  | 15 | 0     | 120 | 100  | 136   | 68 | 0  | 0  | 0  | ■ |
| PFP         | 8  | 22 | 0     | 176 | 156  | 190   | 77 | 12 | 10 | 71 | ■ |
| PHG         | 10 | 16 | 0.500 | 160 | 145  | 188   | 75 | 0  | 7  | 72 | ■ |



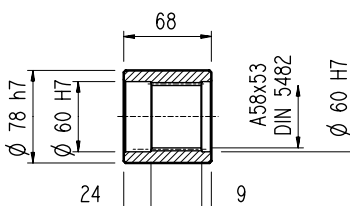
| ★ | Materiale/Material/Material/Màterial                                                                                                                   |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| ■ | Acciaio 39NiCrMo3 Bonificato<br>Steel 39NiCrMo3 hardened and tempered<br>Vergüteter Stahl 39NiCrMo3<br>Acier bonifié 39NiCrMo3                         |
| □ | Acciaio 18NiCrMo5 Cementato e temprato<br>Steel 18NiCrMo5 Case hardened<br>Einsatzstahl 18NiCrMo5 Einsatzgehärtet<br>Acier cementé et trempé 18NiCrMo5 |

**Manicotti lisci / Sleeve couplings**  
**Naben / Manchons lisses a cannelure interieure**

**M0A**

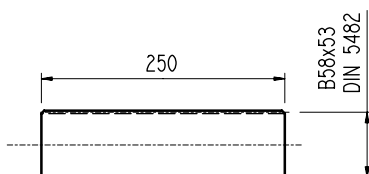
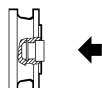


Materiale : Acciaio 16CrNi4  
Material : Steel 16CrNi4  
Material : Stahl 16CrNi4  
Màterial : Acier 16CrNi4



**Barre scanalate / Splined bars**  
**Vielkeilwellen / Barre cannelée**

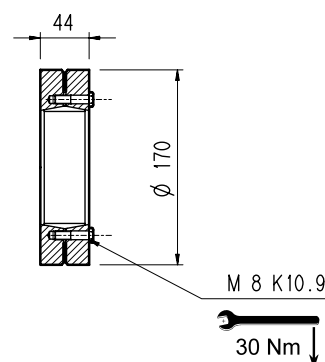
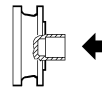
**B0A**



Mat. acciaio 18NiCrMo5 UNI 5331 da cementare e temprare 50-55 HRC  
Case hardening steel 18NiCrMo5 UNI 5331  
must be case hardened 50-55 HRC  
Material: Einsatzstahl 18NiCrMo5 UNI 5331  
muss einsatzgehärtet werden 50-55 HRC  
Acier 18 NiCrMo5 UNI 5331 doit être cémenté trempé 50-55 HRC

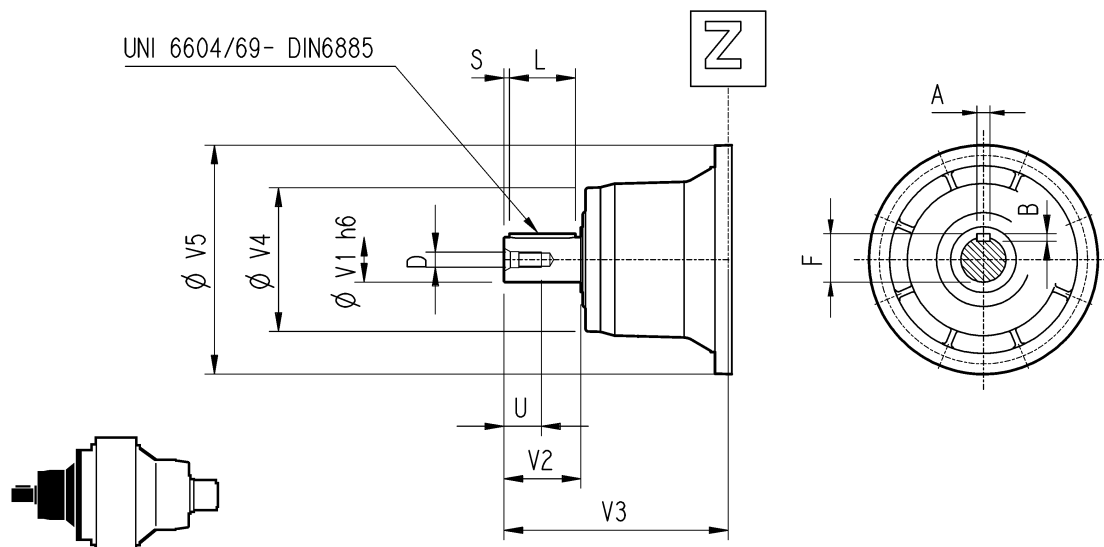
**Giunto ad attrito / Shrink disc**  
**Schrumpfscheibe / Frette de serrage**

**G0A**



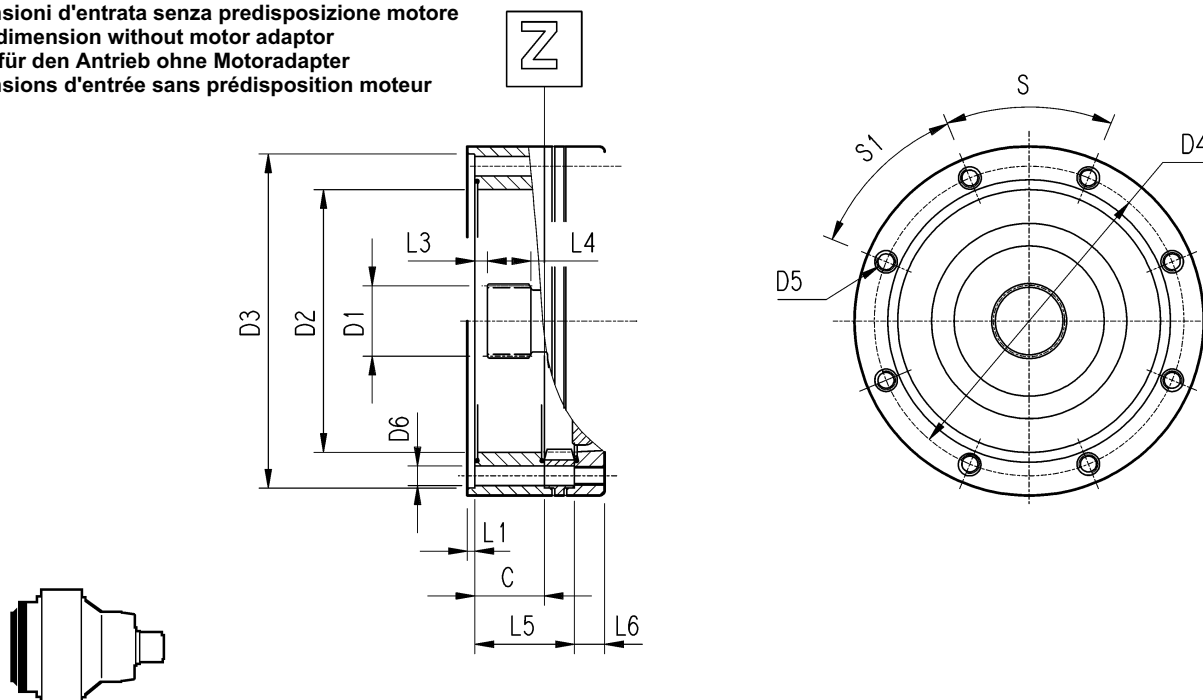
## 305L - 305R

Alberi veloci / Input shaft  
Antriebswellen / Arbres d'entrée



|              | CODE | V1 | V2 | V3    | V4  | V5  | A  | B | F    | L  | S | D   | U  |
|--------------|------|----|----|-------|-----|-----|----|---|------|----|---|-----|----|
| 305 L1       | V05B | 48 | 82 | 239   | 155 | 245 | 14 | 9 | 51.5 | 70 | 6 | M16 | 36 |
| 305 L2       | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27   | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41   | 50 | 4 | M12 | 28 |
| 305 L3       | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27   | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41   | 50 | 4 | M12 | 28 |
| 305 L4       | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27   | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41   | 50 | 4 | M12 | 28 |
| 305 R2-R3-R4 | V01A | 24 | 36 | 137.5 | 120 | 186 | 8  | 7 | 27   | 30 | 3 | M8  | 19 |
|              | V01B | 38 | 58 | 158   | 120 | 186 | 10 | 8 | 41   | 50 | 4 | M12 | 28 |

Dimensioni d'entrata senza predisposizione motore  
Input dimension without motor adaptor  
Maße für den Antrieb ohne Motoradapter  
Dimensions d'entrée sans prédisposition moteur



|              | C  | D1            | D2  | D3     | D4  | D5      | D6 | L1 | L2 | L3 | L4 | L5  | L6 | S   | S1  | Entrata<br>Input<br>Antrieb<br>Entrée |
|--------------|----|---------------|-----|--------|-----|---------|----|----|----|----|----|-----|----|-----|-----|---------------------------------------|
| 305 L1       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | 18 | 9  | 18 | 0   | 0  | 45° | 45° | A                                     |
| 305 L2       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 65  | 18 | 45° | 45° | A                                     |
| 305 L3       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 118 | 18 | 45° | 45° | A                                     |
| 305 L4       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 171 | 18 | 45° | 45° | A                                     |
| 305 R2-R3-R4 | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8 | 11 | 4  | /  | 9  | 18 | 37  | 18 | 45° | 45° | A                                     |

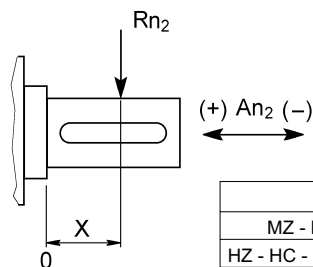
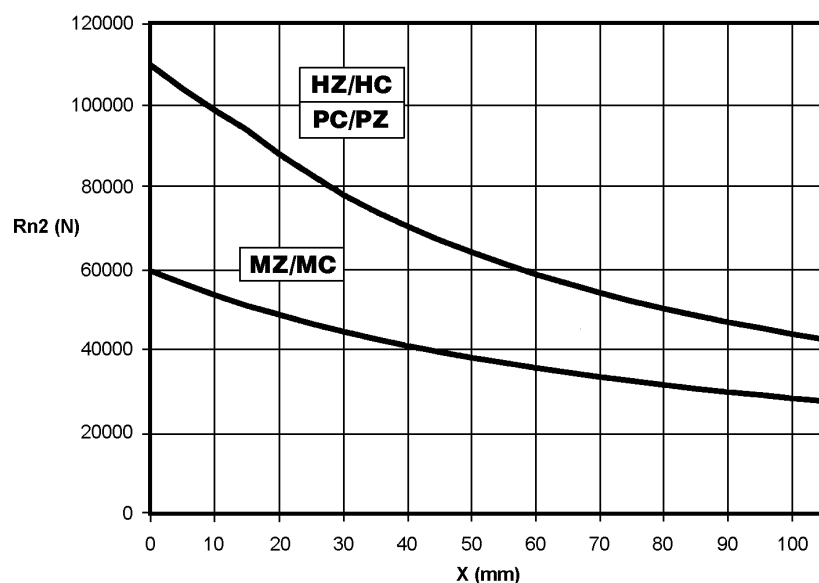
## 305L - 305R

Carichi radiali ed assiali ammissibili sull'albero lento per un valore di  $Fh_2 : n_2 \cdot h = 10\,000$

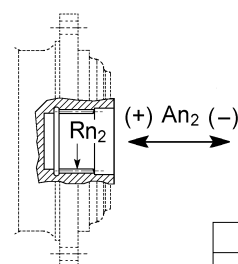
Permissible radial and axial loads on output shaft with  $Fh_2 : n_2 \cdot h = 10\,000$

An der Ausgangswelle zulässige Radiallasten und Axialkräfte für einen Wert von  $Fh_2 : n_2 \cdot h = 10\,000$

Charges radiales et axiales admises sur l'arbre lent pour une valeur de  $Fh_2 : n_2 \cdot h = 10\,000$



|                   | An <sub>2</sub> (+) | An <sub>2</sub> (-) |
|-------------------|---------------------|---------------------|
| MZ - MC           | 55 000              | 44 000              |
| HZ - HC - PC - PZ | 55 000              | 44 000              |



|    | Rn <sub>2</sub> | An <sub>2</sub> (+/-) |
|----|-----------------|-----------------------|
| FZ | 24 000          | 25000                 |

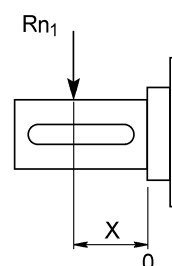
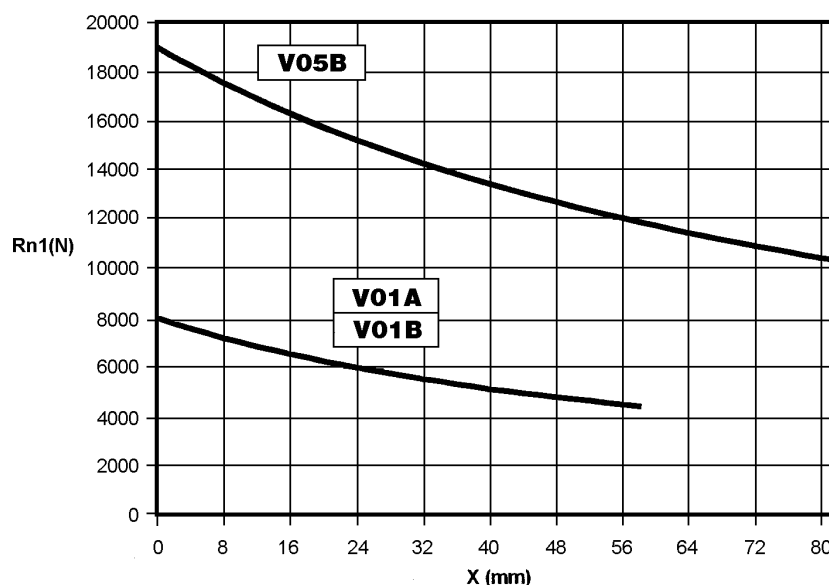
|                                                                                                                                                                                                                                                 |                                      |                   |        |        |        |         |         |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------|--------|--------|--------|---------|---------|-----------|
| Fattore fh <sub>2</sub> correttivo per carichi sugli alberi<br>Load corrective factor fh <sub>2</sub> on shafts<br>Korrektionsfaktor fh <sub>2</sub> für wellenbelastungen<br>Facteur de correetion fh <sub>2</sub> pour charges sur les arbres | Fh <sub>2</sub> = n <sub>2</sub> · h |                   | 10 000 | 25 000 | 50 000 | 100 000 | 500 000 | 1 000 000 |
|                                                                                                                                                                                                                                                 | fh <sub>2</sub>                      | MZ - MC - FZ      | 1      | 0.74   | 0.58   | 0.46    | 0.27    | 0.21      |
|                                                                                                                                                                                                                                                 |                                      | HZ - HC - PC - PZ | 1      | 0.76   | 0.61   | 0.50    | 0.31    | 0.25      |

Carichi radiali ammissibili sull'albero veloce per un valore di  $Fh_1 : n_1 \cdot h = 250\,000$

Permissible radial loads on input shaft with  $Fh_1 : n_1 \cdot h = 250\,000$

An der Antriebswelle zulässige Radiallasten für einen Wert von  $Fh_1 : n_1 \cdot h = 250\,000$

Charges radiales admises sur l'arbre d'entrée pour une valeur de  $Fh_1 : n_1 \cdot h = 250\,000$



| Fattore $fh_1$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_1$ on shafts<br>Korrektionsfaktor $fh_1$ für wellenbelastungen<br>Facteur de correction $fh_1$ pour charges sur les arbres | $Fh_1 = n_1 \cdot h$ |         |         |           |           |           |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|---------|-----------|-----------|-----------|------------|
|                                                                                                                                                                                                             | $fh_1$               | 250 000 | 500 000 | 1 000 000 | 2 000 000 | 5 000 000 | 10 000 000 |
|                                                                                                                                                                                                             |                      | 1       | 0.79    | 0.63      | 0.50      | 0.37      | 0.29       |

# 306L

**M<sub>2</sub> = 8500 Nm**

|  | i     | M <sub>n2</sub> [Nm]        |                             |                             |                              |                              |                                | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|-----------------------------------------------------------------------------------|-------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                   | 1:    | n <sub>2</sub> ·h<br>10 000 | n <sub>2</sub> ·h<br>25 000 | n <sub>2</sub> ·h<br>50 000 | n <sub>2</sub> ·h<br>100 000 | n <sub>2</sub> ·h<br>500 000 | n <sub>2</sub> ·h<br>1 000 000 | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>L1</b>                                                                         | 3.60  | 8 300                       | 7 900                       | 7 700                       | 7 500                        | 6 700                        | 5 400                          | 75             | 18             | 1 500                | 3 000                | 2 600          | 6K                                                                                  |
|                                                                                   | 4.25  | 10 000                      | 9 600                       | 9 400                       | 9 300                        | 6 000                        | 4 850                          | 75             | 18             | 1 500                | 3 000                | 2 600          | 6K                                                                                  |
|                                                                                   | 5.33  | 9 500                       | 8 500                       | 7 800                       | 7 800                        | 5 700                        | 4 600                          | 75             | 18             | 1 500                | 3 000                | 2 100          | 6G                                                                                  |
|                                                                                   | 6.20  | 8 500                       | 7 200                       | 6 500                       | 6 500                        | 5 700                        | 4 650                          | 75             | 18             | 1 500                | 3 000                | 1 500          | 6E                                                                                  |
|                                                                                   | 7.50  | 7 000                       | 5 900                       | 5 500                       | 5 500                        | 4 700                        | 3 850                          | 75             | 18             | 1 500                | 3 000                | 1 100          | 6C                                                                                  |
| <b>L2</b>                                                                         | 13.0  | 7 600                       | 7 300                       | 7 300                       | 7 300                        | 5 100                        | 4 150                          | 40             | 13             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                   | 15.3  | 8 300                       | 7 900                       | 7 700                       | 7 500                        | 5 100                        | 4 150                          | 40             | 13             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                   | 18.1  | 10 000                      | 9 600                       | 9 400                       | 9 300                        | 5 800                        | 4 700                          | 40             | 13             | 1 800                | 3 800                | 630            | 5E                                                                                  |
|                                                                                   | 22.7  | 9 300                       | 9 100                       | 9 100                       | 9 100                        | 5 700                        | 4 600                          | 40             | 13             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                   | 26.4  | 7 500                       | 7 400                       | 7 400                       | 7 400                        | 4 650                        | 3 750                          | 40             | 13             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 28.4  | 9 500                       | 8 500                       | 7 800                       | 7 800                        | 5 700                        | 4 600                          | 40             | 13             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 33.1  | 9 300                       | 8 500                       | 7 800                       | 7 800                        | 5 400                        | 4 400                          | 40             | 13             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 38.4  | 8 500                       | 7 200                       | 6 500                       | 6 500                        | 5 750                        | 4 650                          | 29             | 13             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 46.5  | 8 500                       | 7 200                       | 6 500                       | 6 500                        | 5 750                        | 4 650                          | 25             | 13             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 56.3  | 7 000                       | 5 900                       | 5 500                       | 5 500                        | 4 700                        | 3 850                          | 17.3           | 13             | 1 800                | 3 800                | 400            | 5B                                                                                  |
| <b>L3</b>                                                                         | 45.1  | 7 600                       | 7 300                       | 7 300                       | 7 200                        | 4 450                        | 3 600                          | 20.0           | 7.5            | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 53.2  | 8 300                       | 7 900                       | 7 700                       | 7 500                        | 5 000                        | 4 050                          | 20.0           | 7.5            | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 65.2  | 8 300                       | 7 900                       | 7 700                       | 7 500                        | 4 800                        | 3 900                          | 20.0           | 7.5            | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 77.0  | 10 000                      | 9 600                       | 9 400                       | 8 700                        | 5 400                        | 4 400                          | 20.0           | 7.5            | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 81.9  | 8 100                       | 7 700                       | 7 700                       | 7 500                        | 5 000                        | 4 100                          | 16.2           | 7.5            | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 88.3  | 8 900                       | 8 700                       | 8 700                       | 7 400                        | 4 550                        | 3 700                          | 17.0           | 7.5            | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 104   | 10 000                      | 9 600                       | 9 400                       | 8 300                        | 5 100                        | 4 150                          | 16.3           | 7.5            | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 112   | 7 500                       | 7 400                       | 7 400                       | 7 400                        | 4 600                        | 3 750                          | 11.4           | 7.5            | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 121   | 9 500                       | 8 500                       | 7 800                       | 7 800                        | 5 700                        | 4 600                          | 13.1           | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 141   | 9 300                       | 8 500                       | 7 800                       | 7 800                        | 5 400                        | 4 400                          | 11.4           | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 152   | 7 500                       | 7 400                       | 7 400                       | 7 400                        | 4 650                        | 3 750                          | 8.5            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 184   | 6 800                       | 6 800                       | 6 800                       | 6 800                        | 4 850                        | 3 950                          | 6.4            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 205   | 9 500                       | 8 500                       | 7 800                       | 7 800                        | 5 700                        | 4 600                          | 8.3            | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 222   | 8 500                       | 7 200                       | 6 500                       | 6 500                        | 5 700                        | 4 650                          | 7.1            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 238   | 9 300                       | 8 500                       | 7 800                       | 7 800                        | 5 400                        | 4 400                          | 7.0            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 268   | 7 000                       | 5 900                       | 5 500                       | 5 500                        | 4 700                        | 3 850                          | 5.0            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 288   | 7 000                       | 5 900                       | 5 500                       | 5 500                        | 4 700                        | 3 850                          | 4.7            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 325   | 7 000                       | 5 900                       | 5 500                       | 5 500                        | 4 700                        | 3 850                          | 4.3            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 405   | 7 000                       | 5 900                       | 5 500                       | 5 500                        | 4 700                        | 3 850                          | 3.6            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
| <b>L4</b>                                                                         | 444   | 10 000                      | 9 600                       | 9 400                       | 8 300                        | 5 100                        | 4 150                          | 6.8            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 509   | 8 900                       | 8 700                       | 8 700                       | 7 400                        | 4 550                        | 3 700                          | 5.3            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 589   | 9 500                       | 8 500                       | 7 800                       | 7 800                        | 5 700                        | 4 600                          | 4.7            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 636   | 8 900                       | 8 700                       | 8 700                       | 7 400                        | 4 550                        | 3 700                          | 4.3            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 700   | 9 500                       | 8 500                       | 7 800                       | 7 800                        | 5 700                        | 4 600                          | 4.3            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 809   | 7 500                       | 7 400                       | 7 400                       | 7 400                        | 4 650                        | 3 750                          | 3.3            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 877   | 7 500                       | 7 400                       | 7 400                       | 7 400                        | 4 650                        | 3 750                          | 3.1            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 015 | 9 300                       | 8 500                       | 7 800                       | 7 800                        | 5 400                        | 4 400                          | 3.0            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 095 | 7 500                       | 7 400                       | 7 400                       | 7 400                        | 4 650                        | 3 750                          | 2.6            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 279 | 8 500                       | 7 200                       | 6 500                       | 6 500                        | 5 700                        | 4 650                          | 2.4            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 475 | 9 500                       | 8 500                       | 7 800                       | 7 800                        | 5 700                        | 4 600                          | 2.0            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 597 | 8 500                       | 7 200                       | 6 500                       | 6 500                        | 5 700                        | 4 650                          | 1.9            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 872 | 7 000                       | 5 900                       | 5 500                       | 5 500                        | 4 700                        | 3 850                          | 1.6            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 074 | 7 000                       | 5 900                       | 5 500                       | 5 500                        | 4 700                        | 3 850                          | 1.5            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 337 | 7 000                       | 5 900                       | 5 500                       | 5 500                        | 4 700                        | 3 850                          | 1.3            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 916 | 7 000                       | 5 900                       | 5 500                       | 5 500                        | 4 700                        | 3 850                          | 1.0            | 6              | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

**M<sub>2</sub> = 8500 Nm**

**306R**

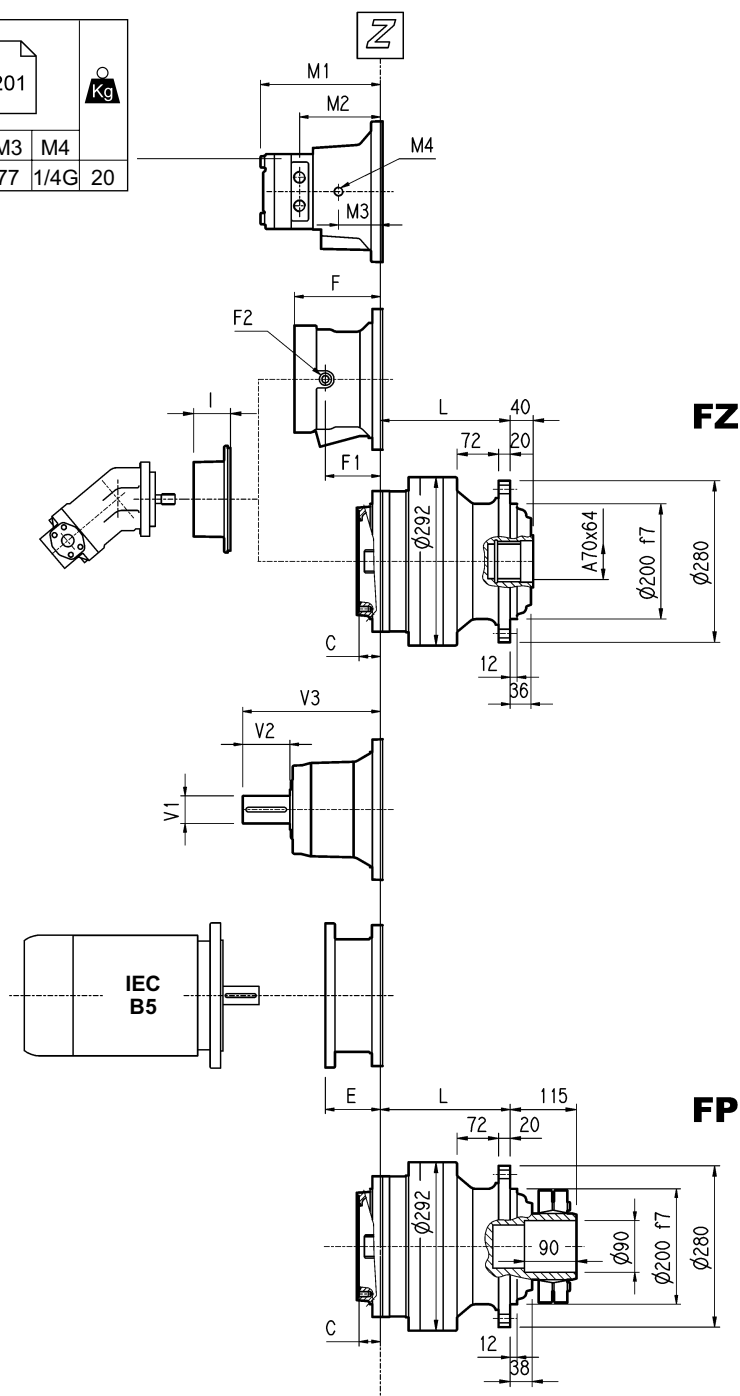
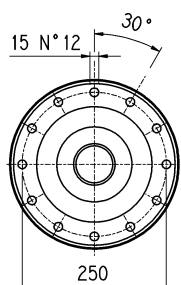
|  | i    | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|----------------------------------------------------------------------------------|------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                  |      | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h |                |                |                      |                      |                |                                                                                     |
|                                                                                  | 1:   | 10 000               | 25 000            | 50 000            | 100 000           | 500 000           | 1 000 000         | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>R2</b>                                                                        | 9.23 | 4 650                | 4 050             | 3 600             | 3 200             | 2 000             | 1 600             | 35             | 18             | 1 800                | 3 800                | 440            | 4L                                                                                  |
|                                                                                  | 10.9 | 5 300                | 4 650             | 4 150             | 3 600             | 2 200             | 1 800             | 35             | 18             | 1 800                | 3 800                | 440            | 4L                                                                                  |
|                                                                                  | 13.7 | 6 500                | 5 600             | 5 100             | 4 200             | 2 600             | 2 100             | 35             | 18             | 1 800                | 3 800                | 440            | 4L                                                                                  |
|                                                                                  | 15.9 | 7 300                | 6 400             | 5 700             | 4 700             | 2 900             | 2 350             | 35             | 18             | 1 800                | 3 800                | 440            | 4L                                                                                  |
|                                                                                  | 19.2 | 7 000                | 5 900             | 5 500             | 5 400             | 3 300             | 2 700             | 35             | 18             | 1 800                | 3 800                | 400            | 4K                                                                                  |
| <b>R3</b>                                                                        | 33.2 | 7 600                | 7 300             | 7 300             | 7 300             | 4 700             | 3 800             | 35             | 14             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 39.2 | 8 300                | 7 900             | 7 700             | 7 500             | 5 100             | 4 150             | 34             | 14             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 46.3 | 10 000               | 9 600             | 9 400             | 9 300             | 5 800             | 4 700             | 35             | 14             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 58.1 | 9 300                | 9 100             | 9 100             | 9 100             | 5 700             | 4 600             | 27             | 14             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 67.5 | 7 500                | 7 400             | 7 400             | 7 400             | 4 600             | 3 750             | 19             | 14             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 72.9 | 9 500                | 8 500             | 7 800             | 7 800             | 5 700             | 4 600             | 21             | 14             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 84.7 | 9 300                | 8 500             | 7 800             | 7 800             | 5 400             | 4 400             | 18             | 14             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 98.5 | 8 500                | 7 200             | 6 500             | 6 500             | 5 700             | 4 650             | 14             | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 119  | 8 500                | 7 200             | 6 500             | 6 500             | 5 700             | 4 650             | 11.8           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 144  | 7 000                | 5 900             | 5 500             | 5 500             | 4 700             | 3 850             | 8.3            | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
| <b>R4</b>                                                                        | 158  | 10 000               | 9 600             | 9 400             | 8 800             | 5 400             | 4 400             | 15.0           | 12             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 168  | 8 100                | 7 700             | 7 700             | 7 500             | 5 000             | 4 100             | 14.0           | 12             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 181  | 8 900                | 8 700             | 8 700             | 7 400             | 4 550             | 3 700             | 14.4           | 12             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 214  | 10 000               | 9 600             | 9 400             | 8 300             | 5 100             | 4 150             | 13.8           | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 230  | 7 500                | 7 400             | 7 400             | 7 400             | 4 650             | 3 750             | 9.5            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 249  | 9 500                | 8 500             | 7 800             | 7 800             | 5 700             | 4 600             | 11.3           | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 289  | 9 300                | 8 500             | 7 800             | 7 800             | 5 400             | 4 400             | 9.5            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 312  | 7 500                | 7 400             | 7 400             | 7 400             | 4 650             | 3 750             | 7.3            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 377  | 6 800                | 6 800             | 6 800             | 6 800             | 4 850             | 3 950             | 5.5            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 420  | 9 500                | 8 500             | 7 800             | 7 800             | 5 700             | 4 600             | 7.1            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 455  | 8 500                | 7 200             | 6 500             | 6 500             | 5 700             | 4 650             | 6.2            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 488  | 9 300                | 8 500             | 7 800             | 7 800             | 5 400             | 4 400             | 6.1            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 550  | 7 000                | 5 900             | 5 500             | 5 500             | 4 700             | 3 850             | 4.4            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 590  | 7 000                | 5 900             | 5 500             | 5 500             | 4 700             | 3 850             | 3.5            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 665  | 7 000                | 5 900             | 5 500             | 5 500             | 4 700             | 3 850             | 3.7            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 830  | 7 000                | 5 900             | 5 500             | 5 500             | 4 700             | 3 850             | 3.1            | 12             | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$



# 306L

| Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |    |     |     |     |     |     |     |     |    |      |    |
|-------------------------------------------------------------------------|----|-----|-----|-----|-----|-----|-----|-----|----|------|----|
| MG                                                                      |    |     |     |     |     |     |     | 201 |    | Kg   |    |
| cm <sup>3</sup>                                                         | 50 | 80  | 100 | 125 | 160 | 200 | 250 | M2  | M3 | M4   |    |
| 306L2                                                                   | -  | 184 | 188 | 192 | 199 | 206 | 215 | 135 | 77 | 1/4G | 20 |



|             |                           |           |
|-------------|---------------------------|-----------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 12 000 Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |           |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |           |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |           |

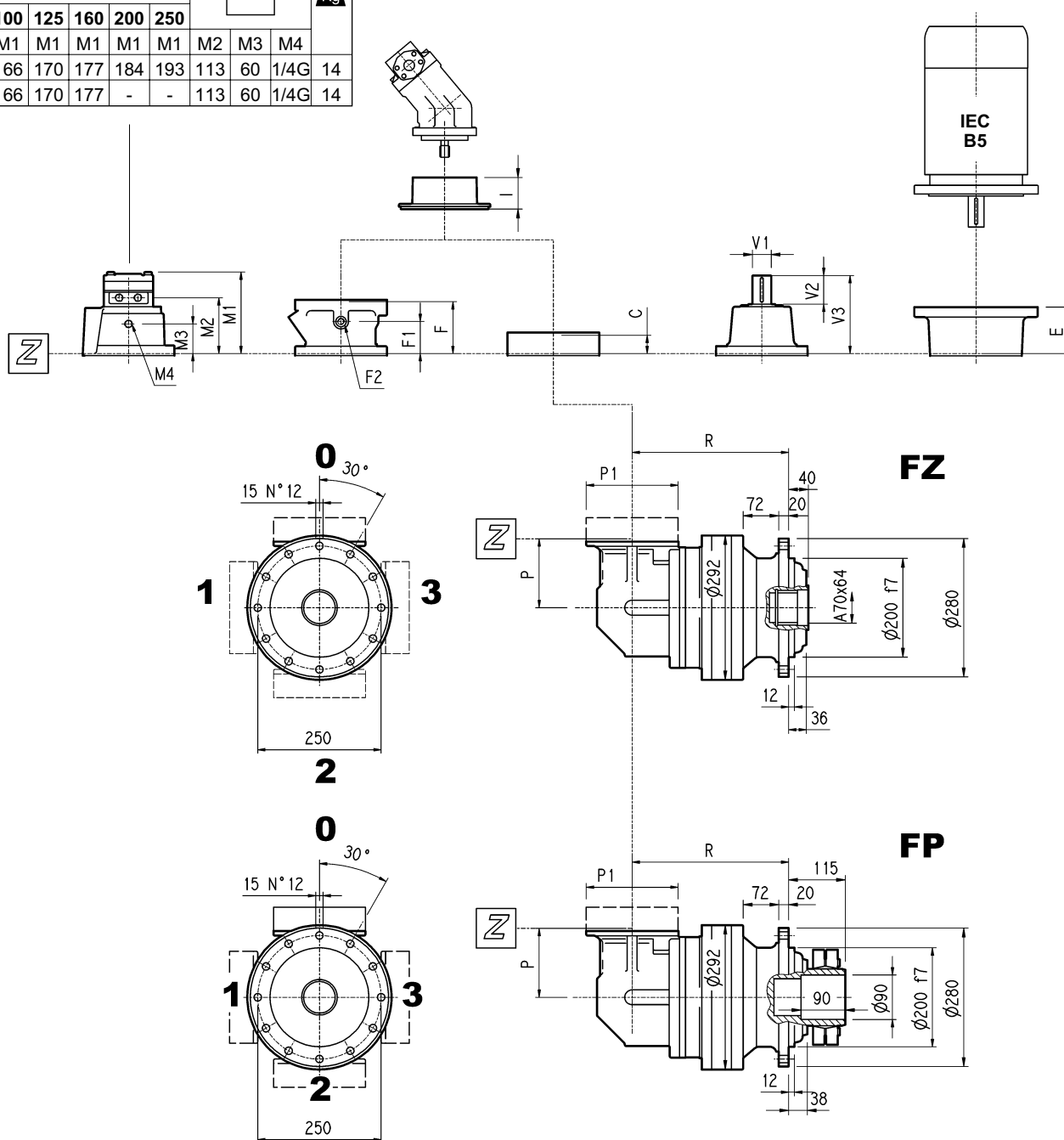
|               | <b>L</b> |       |       |       |  |       |       |       |  |                                    |  |  |     |       |                             |                                    |                                                                                       |
|---------------|----------|-------|-------|-------|-------------------------------------------------------------------------------------|-------|-------|-------|-------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----|-------|-----------------------------|------------------------------------|---------------------------------------------------------------------------------------|
|               | MZ MC    | FZ FP | HZ HC | PC PZ | MZ MC                                                                               | FZ FP | HZ HC | PC PZ | C                                                                                   | Entrata Input<br>Antrieb<br>Entrée | I                                                                                   | F                                                                                   | F1  | F2    | Typo<br>Type<br>Typ<br>Type | Entrata Input<br>Antrieb<br>Entrée |  |
| <b>306 L1</b> | 160      | 160   | 195   | 235   | 65                                                                                  | 65    | 70    | 80    | 45                                                                                  | B                                  |  | 195                                                                                 | 147 | 1/4 G | 6                           | B                                  | 28                                                                                    |
| <b>306 L2</b> | 225      | 225   | 260   | 300   | 74                                                                                  | 74    | 79    | 89    | 37                                                                                  | A                                  |                                                                                     | 145                                                                                 | 95  | 1/4 G | 5                           | A                                  | 16                                                                                    |
| <b>306 L3</b> | 278      | 278   | 313   | 353   | 78                                                                                  | 78    | 83    | 93    | 37                                                                                  | A                                  |                                                                                     | 105                                                                                 | 65  | 1/4 G | 4                           | A                                  | 10                                                                                    |
| <b>306 L4</b> | 331      | 331   | 366   | 406   | 82                                                                                  | 82    | 87    | 97    | 37                                                                                  | A                                  |                                                                                     | 191                                                                                 | 105 | 65    | 1/4 G                       | 4                                  | A                                                                                     |

|        | V1 | V2  | V3    |  | V1 | V2 | V3  |  | E |        |        |        |         |         |         |         |         |         |         |         |
|--------|----|-----|-------|-------------------------------------------------------------------------------------|----|----|-----|---------------------------------------------------------------------------------------|---|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
|        |    |     |       |                                                                                     |    |    |     |                                                                                       |   | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 | IEC 200 | IEC 225 | IEC 250 |
| 306 L1 | 60 | 105 | 307   | 23                                                                                  |    |    |     |                                                                                       |   | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 | IEC 200 | IEC 225 | IEC 250 |
| 306 L2 | 48 | 82  | 239   | 15                                                                                  |    |    |     |                                                                                       |   |        |        |        |         |         | 114     | 144     | 144     | 174     |         | 193     |
| 306 L3 | 24 | 36  | 137.5 | 6                                                                                   | 38 | 58 | 158 | 7                                                                                     |   | 65     | 84     | 84     | 94      | 94      | 114     | 144     |         |         |         |         |
| 306 L4 | 24 | 36  | 137.5 | 6                                                                                   | 38 | 58 | 158 | 7                                                                                     |   | 65     | 84     | 84     | 94      | 94      | 114     | 144     |         |         |         |         |



# 306R

| Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     |     | <div><br/>201</div> |    |      | <div><br/>Kg</div> |
|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|------------------------------------------------------------------------------------------------------|----|------|-----------------------------------------------------------------------------------------------------|
| MG                                                                      |     |     |     |     |     |     |     |                                                                                                      |    |      |                                                                                                     |
| cm <sup>3</sup>                                                         | 50  | 80  | 100 | 125 | 160 | 200 | 250 | M2                                                                                                   | M3 | M4   |                                                                                                     |
|                                                                         | M1  | M1  | M1  | M1  | M1  | M1  | M1  |                                                                                                      |    |      |                                                                                                     |
| 306R2                                                                   | -   | 162 | 166 | 170 | 177 | 184 | 193 | 113                                                                                                  | 60 | 1/4G | 14                                                                                                  |
| 306R3                                                                   | 156 | 162 | 166 | 170 | 177 | -   | -   | 113                                                                                                  | 60 | 1/4G | 14                                                                                                  |



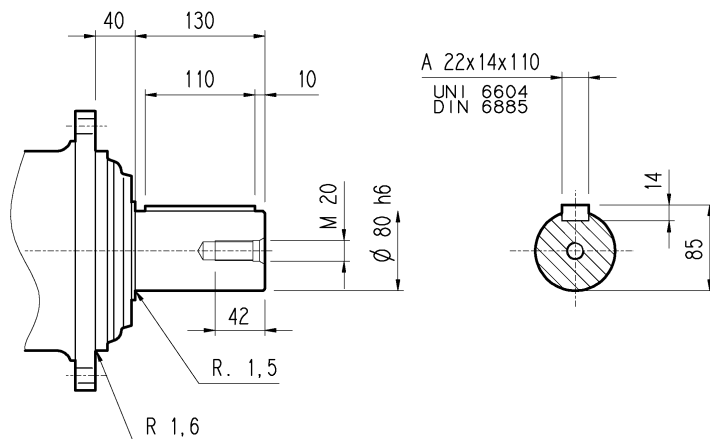
|                                                       |                                                                                                            |           |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | 12 000 Nm |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------|

|        | R        |          |          |          | P   | P1  | Kg       |          |          |          | C  | Entrata<br>Input<br>Antrieb<br>Entrée | I   | F   | F1 | F2    | Tipo<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée | Kg |
|--------|----------|----------|----------|----------|-----|-----|----------|----------|----------|----------|----|---------------------------------------|-----|-----|----|-------|-----------------------------|---------------------------------------|----|
|        | MZ<br>MC | FZ<br>FP | HZ<br>HC | PC<br>PZ |     |     | MZ<br>MC | FZ<br>FP | HZ<br>HC | PC<br>PZ |    |                                       |     |     |    |       |                             |                                       |    |
| 306 R2 | 297      | 297      | 332      | 372      | 140 | 186 | 89       | 89       | 94       | 104      | 37 | A                                     |     | 105 | 65 | 1/4 G | 4                           | A                                     | 10 |
| 306 R3 | 317      | 317      | 352      | 392      | 140 | 186 | 85       | 85       | 90       | 100      | 37 | A                                     |     | 105 | 65 | 1/4 G | 4                           | A                                     | 10 |
| 306 R4 | 370      | 370      | 405      | 445      | 122 | 186 | 79       | 79       | 84       | 94       | 37 | A                                     | 191 | 105 | 65 | 1/4 G | 4                           | A                                     | 10 |

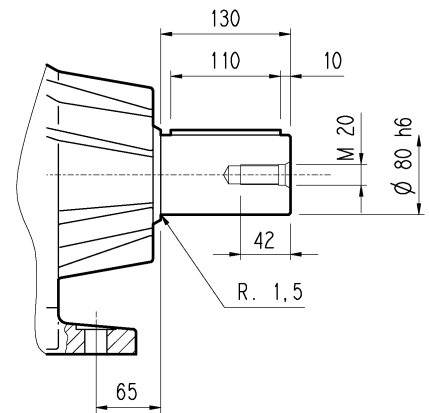
|        | V1 | V2 | V3    | Kg | V1 | V2 | V3  | Kg | E      |        |        |         |         |         |         |  |  |  |
|--------|----|----|-------|----|----|----|-----|----|--------|--------|--------|---------|---------|---------|---------|--|--|--|
|        |    |    |       |    |    |    |     |    | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 |  |  |  |
| 306 R2 | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     | 144     |  |  |  |
| 306 R3 | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     | 144     |  |  |  |
| 306 R4 | 24 | 36 | 137.5 | 6  | 38 | 58 | 158 | 7  | 65     | 84     | 84     | 94      | 94      | 114     | 144     |  |  |  |

# 306L - 306R

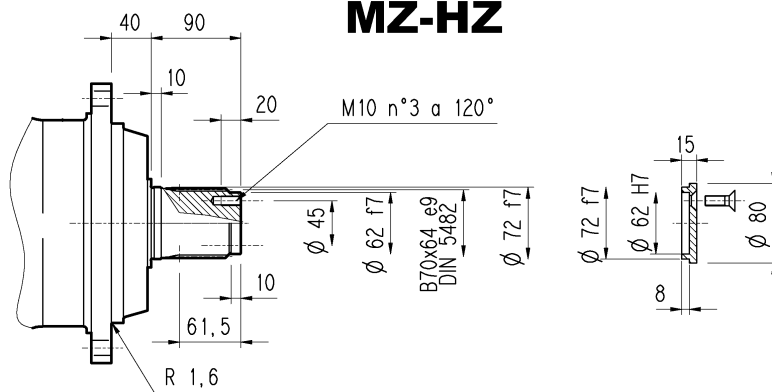
## MC-HC



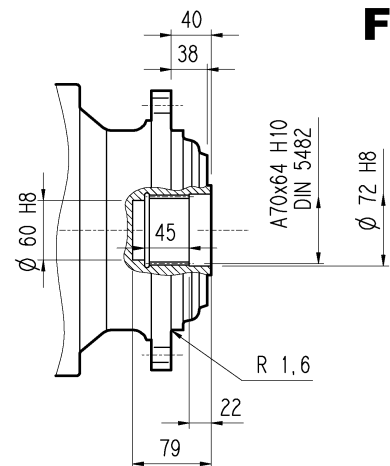
## PC



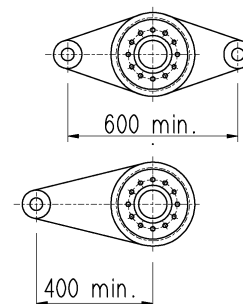
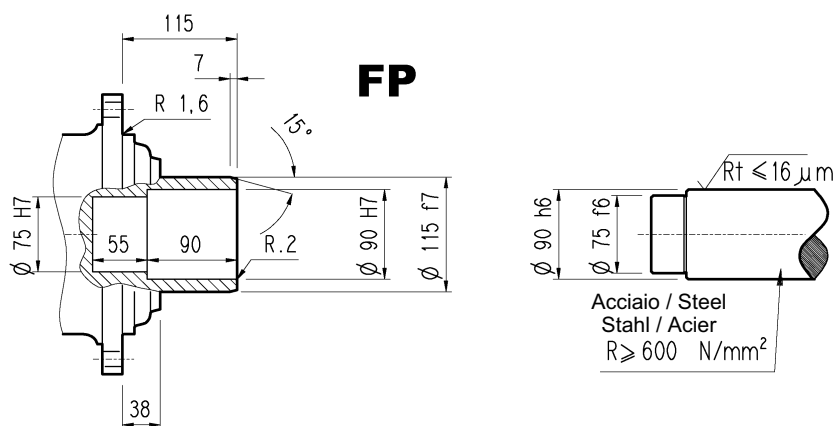
## MZ-HZ



## FZ



## FP



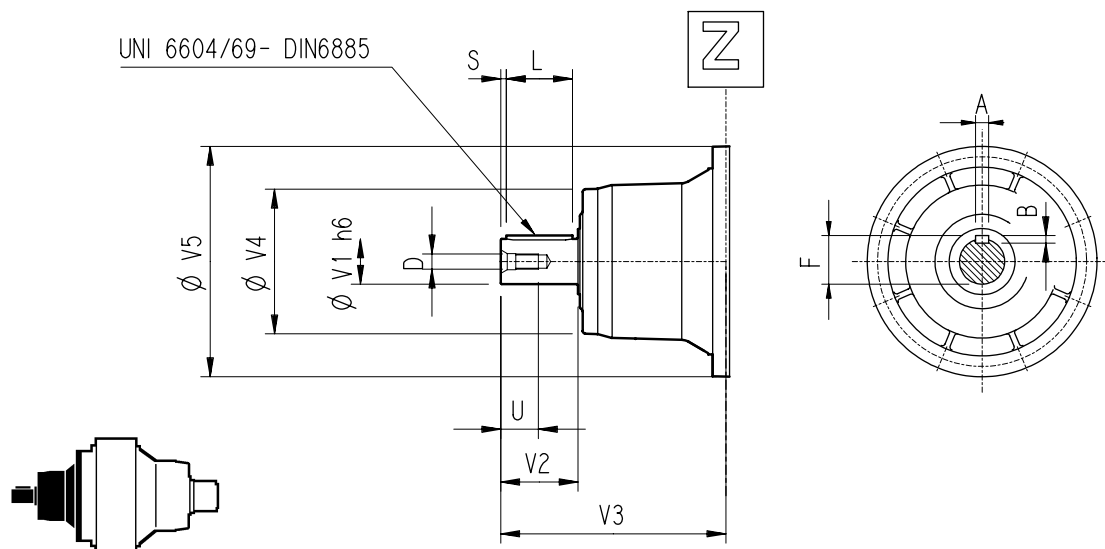
|             |                           |           |
|-------------|---------------------------|-----------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 12 000 Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |           |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |           |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |           |



# 306L - 306R

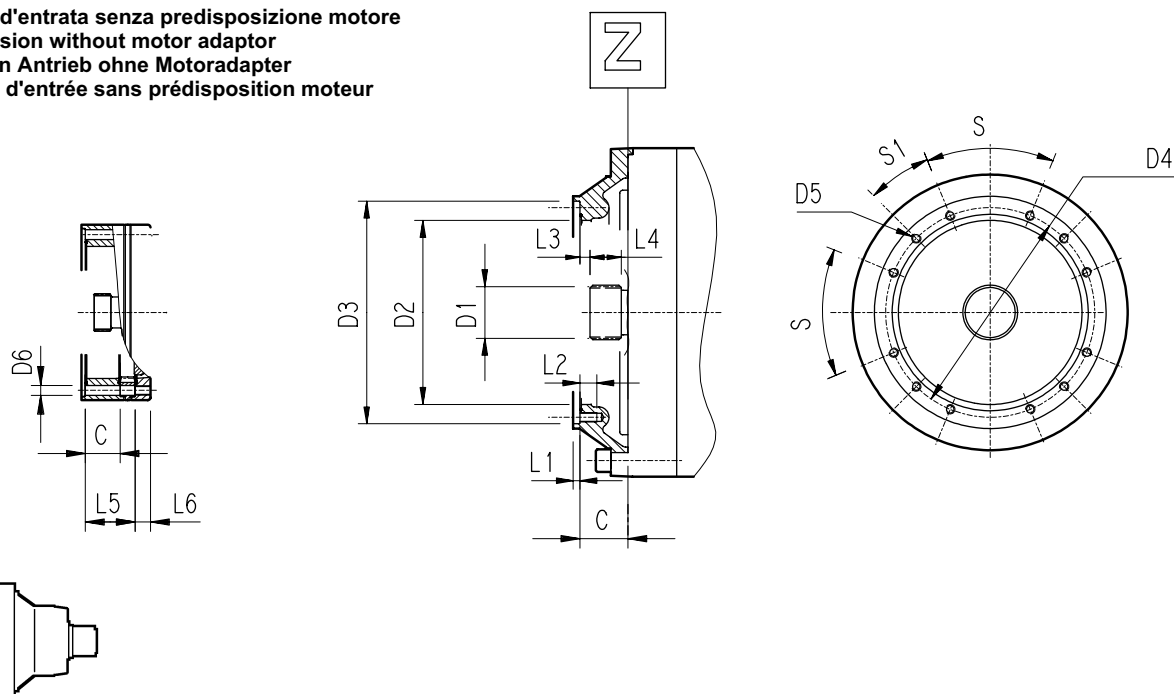
Alberi veloci / Input shaft  
Antriebswellen / Arbres d'entrée

UNI 6604/69- DIN6885



|              | CODE | V1 | V2  | V3    | V4  | V5  | A  | B  | F    | L  | S   | D   | U  |
|--------------|------|----|-----|-------|-----|-----|----|----|------|----|-----|-----|----|
| 306 L1       | V06B | 60 | 105 | 307   | 155 | 292 | 18 | 11 | 64   | 90 | 7.5 | M16 | 36 |
| 306 L2       | V05B | 48 | 82  | 239   | 155 | 245 | 14 | 9  | 51.5 | 70 | 6   | M16 | 36 |
| 306 L3       | V01A | 24 | 36  | 137.5 | 120 | 186 | 8  | 7  | 27   | 30 | 3   | M8  | 19 |
|              | V01B | 38 | 58  | 158   | 120 | 186 | 10 | 8  | 41   | 50 | 4   | M12 | 28 |
| 306 L4       | V01A | 24 | 36  | 137.5 | 120 | 186 | 8  | 7  | 27   | 30 | 3   | M8  | 19 |
|              | V01B | 38 | 58  | 158   | 120 | 186 | 10 | 8  | 41   | 50 | 4   | M12 | 28 |
| 306 R2-R3-R4 | V01A | 24 | 36  | 137.5 | 120 | 186 | 8  | 7  | 27   | 30 | 3   | M8  | 19 |
|              | V01B | 38 | 58  | 158   | 120 | 186 | 10 | 8  | 41   | 50 | 4   | M12 | 28 |

Dimensioni d'entrata senza predisposizione motore  
Input dimension without motor adaptor  
Maße für den Antrieb ohne Motoradapter  
Dimensions d'entrée sans prédisposition moteur



|              | C  | D1            | D2  | D3     | D4  | D5       | D6 | L1 | L2 | L3 | L4 | L5  | L6 | S   | S1    | Entrata<br>Input<br>Antrieb<br>Entrée |
|--------------|----|---------------|-----|--------|-----|----------|----|----|----|----|----|-----|----|-----|-------|---------------------------------------|
| 306 L1       | 45 | 58x53 DIN5482 | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11 | 22 | /   | /  | 45° | 22.5° | B                                     |
| 306 L2       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8  | 0  | 4  | 18 | 9  | 18 | 0   | 0  | 45° | 45°   | A                                     |
| 306 L3       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | /  | 9  | 18 | 53  | 18 | 45° | 45°   | A                                     |
| 306 L4       | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | /  | 9  | 18 | 106 | 18 | 45° | 45°   | A                                     |
| 306 R2-R3-R4 | 37 | 40x36 DIN5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | /  | 9  | 18 | 37  | 18 | 45° | 45°   | A                                     |

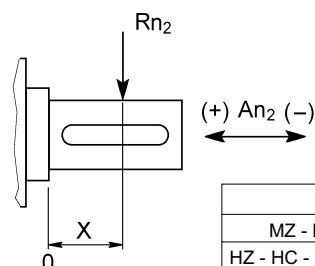
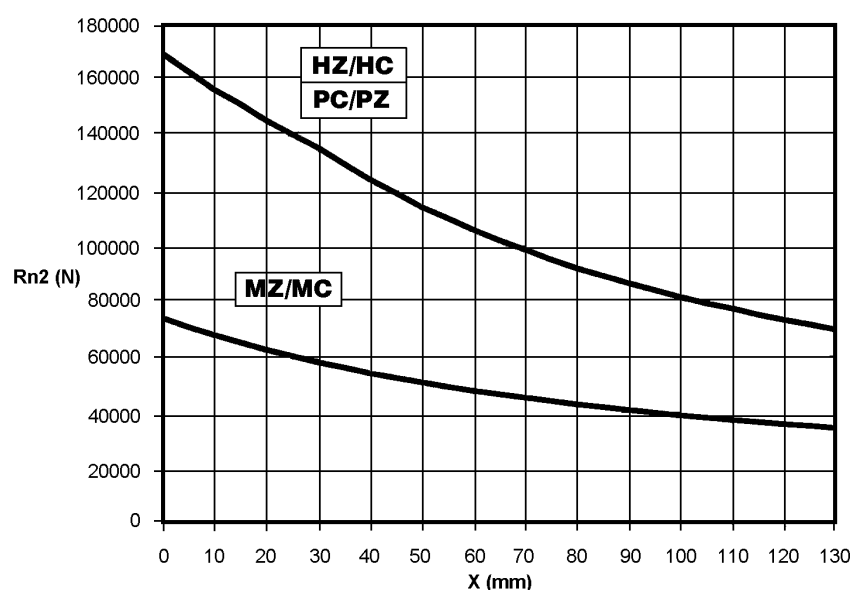
## 306L - 306R

Carichi radiali ed assiali ammissibili sull'albero lento per un valore di  $Fh_2 : n_2 \cdot h = 10\ 000$

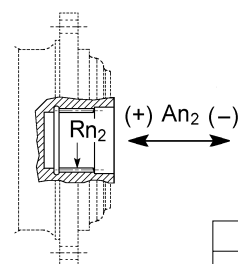
Permissible radial and axial loads on output shaft with  $Fh_2 : n_2 \cdot h = 10\ 000$

An der Ausgangswelle zulässige Radiallasten und Axialkräfte für einen Wert von  $Fh_2 : n_2 \cdot h = 10\ 000$

Charges radiales et axiales admissibles sur l'arbre lent pour une valeur de  $Fh_2 : n_2 \cdot h = 10\ 000$



|                   | An2 (+) | An2 (-) |
|-------------------|---------|---------|
| MZ - MC           | 70 000  | 44 000  |
| HZ - HC - PC - PZ | 120 000 | 60 000  |



|    | Rn2    | An2 (+/-) |
|----|--------|-----------|
| FZ | 35 000 | 35 000    |

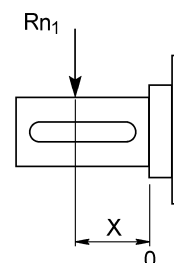
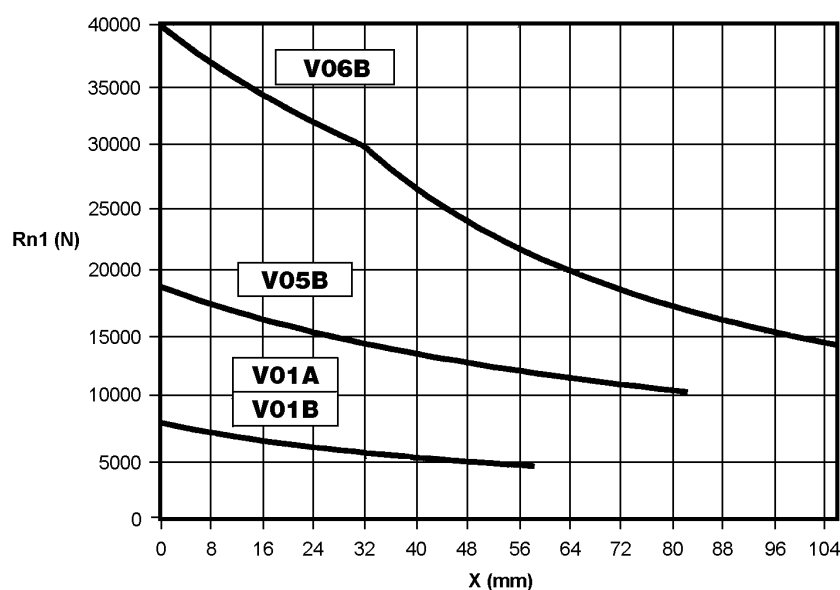
|                                                                                                                                                                                                                                                 |                                      |                   |        |        |        |         |         |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------|--------|--------|--------|---------|---------|-----------|
| Fattore fh <sub>2</sub> correttivo per carichi sugli alberi<br>Load corrective factor fh <sub>2</sub> on shafts<br>Korrektionsfaktor fh <sub>2</sub> für wellenbelastungen<br>Facteur de corréction fh <sub>2</sub> pour charges sur les arbres | Fh <sub>2</sub> = n <sub>2</sub> · h |                   | 10 000 | 25 000 | 50 000 | 100 000 | 500 000 | 1 000 000 |
|                                                                                                                                                                                                                                                 | fh <sub>2</sub>                      | MZ - MC - FZ      | 1      | 0.74   | 0.58   | 0.46    | 0.27    | 0.21      |
|                                                                                                                                                                                                                                                 |                                      | HZ - HC - PC - PZ | 1      | 0.76   | 0.61   | 0.50    | 0.31    | 0.25      |

Carichi radiali ammissibili sull'albero veloce per un valore di  $Fh_1 : n_1 \cdot h = 250\ 000$

Permissible radial loads on input shaft with  $Fh_1 : n_1 \cdot h = 250\ 000$

An der Antriebswelle zulässige Radiallasten für einen Wert von  $Fh_1 : n_1 \cdot h = 250\ 000$

Charges radiales admises sur l'arbre d'entrée pour une valeur de  $Fh_1 : n_1 \cdot h = 250\ 000$



| Fattore $fh_1$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_1$ on shafts<br>Korrektionsfaktor $fh_1$ für wellenbelastungen<br>Facteur de correction $fh_1$ pour charges sur les arbres | $Fh_1 = n_1 \cdot h$ |         |         |           |           |           |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|---------|-----------|-----------|-----------|------------|
|                                                                                                                                                                                                             | $fh_1$               | 250 000 | 500 000 | 1 000 000 | 2 000 000 | 5 000 000 | 10 000 000 |
|                                                                                                                                                                                                             |                      | 1       | 0.79    | 0.63      | 0.50      | 0.37      | 0.29       |

# 307L

**M<sub>2</sub> = 12500 Nm**

|  | i     | M <sub>n2</sub> [Nm]        |                             |                             |                              |                              |                                | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|-----------------------------------------------------------------------------------|-------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                   | 1:    | n <sub>2</sub> ·h<br>10 000 | n <sub>2</sub> ·h<br>25 000 | n <sub>2</sub> ·h<br>50 000 | n <sub>2</sub> ·h<br>100 000 | n <sub>2</sub> ·h<br>500 000 | n <sub>2</sub> ·h<br>1 000 000 | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>L1</b>                                                                         | 3.43  | 9 000                       | 9 000                       | 9 000                       | 9 000                        | 8 000                        | 6 500                          | 100            | 22             | 1 500                | 2 500                | 3 200          | 6L                                                                                  |
|                                                                                   | 4.09  | 15 000                      | 13 800                      | 12 900                      | 12 500                       | 7 900                        | 6 400                          | 100            | 22             | 1 500                | 2 500                | 3 200          | 6L                                                                                  |
|                                                                                   | 5.25  | 14 000                      | 12 000                      | 10 700                      | 10 500                       | 7 700                        | 6 200                          | 100            | 22             | 1 500                | 2 500                | 3 200          | 6L                                                                                  |
|                                                                                   | 6.23  | 11 000                      | 9 600                       | 8 700                       | 8 700                        | 7 700                        | 6 200                          | 100            | 22             | 1 500                | 2 500                | 2 100          | 6G                                                                                  |
| <b>L2</b>                                                                         | 12.3  | 9 000                       | 9 000                       | 9 000                       | 9 000                        | 8 000                        | 6 500                          | 60             | 18             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                   | 14.7  | 15 000                      | 13 800                      | 12 900                      | 12 500                       | 7 900                        | 6 400                          | 60             | 18             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                   | 17.4  | 15 000                      | 13 800                      | 12 900                      | 12 500                       | 7 900                        | 6 400                          | 60             | 18             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                   | 21.8  | 15 000                      | 13 800                      | 12 900                      | 12 500                       | 7 900                        | 6 400                          | 60             | 18             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                   | 25.4  | 14 500                      | 13 800                      | 12 900                      | 12 500                       | 7 900                        | 6 400                          | 60             | 18             | 1 800                | 3 800                | 630            | 5E                                                                                  |
|                                                                                   | 28.0  | 14 000                      | 12 000                      | 10 700                      | 10 500                       | 7 700                        | 6 200                          | 60             | 18             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                   | 30.7  | 12 300                      | 12 300                      | 12 300                      | 12 300                       | 7 800                        | 6 300                          | 60             | 18             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                   | 32.6  | 14 000                      | 12 000                      | 10 700                      | 10 500                       | 7 700                        | 6 200                          | 56             | 18             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                   | 38.6  | 11 000                      | 9 600                       | 8 700                       | 8 700                        | 7 700                        | 6 200                          | 39             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 46.7  | 11 000                      | 9 600                       | 8 700                       | 8 700                        | 7 700                        | 6 200                          | 33             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
| <b>L3</b>                                                                         | 51.3  | 15 000                      | 13 800                      | 12 900                      | 12 500                       | 7 900                        | 6 400                          | 30             | 11             | 2 000                | 4 000                | 330            | 4H                                                                                  |
|                                                                                   | 60.5  | 15 000                      | 13 800                      | 12 900                      | 12 500                       | 7 900                        | 6 400                          | 30             | 11             | 2 000                | 4 000                | 330            | 4H                                                                                  |
|                                                                                   | 74.1  | 15 000                      | 13 800                      | 12 900                      | 12 500                       | 7 900                        | 6 400                          | 30             | 11             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 80.6  | 14 000                      | 12 000                      | 10 700                      | 10 500                       | 7 700                        | 6 200                          | 27             | 11             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 93.0  | 15 000                      | 13 800                      | 12 900                      | 12 500                       | 7 900                        | 6 400                          | 26             | 11             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 100   | 15 000                      | 13 800                      | 12 900                      | 12 500                       | 7 900                        | 6 400                          | 25             | 11             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 113   | 14 000                      | 12 000                      | 10 700                      | 10 500                       | 7 700                        | 6 200                          | 20             | 11             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 126   | 15 000                      | 13 800                      | 12 900                      | 12 500                       | 7 900                        | 6 400                          | 20             | 11             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 139   | 14 000                      | 12 000                      | 10 700                      | 10 500                       | 7 700                        | 6 200                          | 17.1           | 11             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 153   | 11 000                      | 9 600                       | 8 700                       | 8 700                        | 7 700                        | 6 200                          | 12.3           | 11             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 162   | 14 000                      | 12 000                      | 10 700                      | 10 500                       | 7 700                        | 6 200                          | 15.1           | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 177   | 12 300                      | 12 300                      | 12 300                      | 12 300                       | 7 800                        | 6 300                          | 12.0           | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 202   | 14 000                      | 12 000                      | 10 700                      | 10 500                       | 7 700                        | 6 200                          | 11.9           | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 223   | 11 000                      | 9 600                       | 8 700                       | 8 700                        | 7 700                        | 6 200                          | 9.0            | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 239   | 11 000                      | 9 600                       | 8 700                       | 8 700                        | 7 700                        | 6 200                          | 8.5            | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 284   | 14 000                      | 12 000                      | 10 700                      | 10 500                       | 7 700                        | 6 200                          | 9.3            | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 336   | 11 000                      | 9 600                       | 8 700                       | 8 700                        | 7 700                        | 6 200                          | 6.4            | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
| <b>L4</b>                                                                         | 349   | 15 000                      | 13 800                      | 12 900                      | 12 500                       | 7 900                        | 6 400                          | 12.9           | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 406   | 14 000                      | 12 000                      | 10 700                      | 10 500                       | 7 700                        | 6 200                          | 10.2           | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 465   | 14 000                      | 12 000                      | 10 700                      | 10 500                       | 7 700                        | 6 200                          | 9.7            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 509   | 15 000                      | 13 800                      | 12 900                      | 12 500                       | 7 900                        | 6 400                          | 8.4            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 579   | 15 000                      | 13 800                      | 12 900                      | 12 500                       | 7 900                        | 6 400                          | 7.8            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 654   | 14 000                      | 12 000                      | 10 700                      | 10 500                       | 7 700                        | 6 200                          | 6.9            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 722   | 15 000                      | 13 800                      | 12 900                      | 12 500                       | 7 900                        | 6 400                          | 6.2            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 801   | 14 000                      | 12 000                      | 10 700                      | 10 500                       | 7 700                        | 6 200                          | 5.6            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 906   | 15 000                      | 13 800                      | 12 900                      | 12 500                       | 7 900                        | 6 400                          | 5.0            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 999   | 14 000                      | 12 000                      | 10 700                      | 10 500                       | 7 700                        | 6 200                          | 4.5            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 149 | 11 000                      | 9 600                       | 8 700                       | 8 700                        | 7 700                        | 6 200                          | 3.6            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 274 | 12 300                      | 12 300                      | 12 300                      | 12 300                       | 7 800                        | 6 300                          | 3.5            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 380 | 11 000                      | 9 600                       | 8 700                       | 8 700                        | 7 700                        | 6 200                          | 3.1            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 605 | 11 000                      | 9 600                       | 8 700                       | 8 700                        | 7 700                        | 6 200                          | 2.7            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 723 | 11 000                      | 9 600                       | 8 700                       | 8 700                        | 7 700                        | 6 200                          | 2.5            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 041 | 14 000                      | 12 000                      | 10 700                      | 10 500                       | 7 700                        | 6 200                          | 2.2            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 423 | 11 000                      | 9 600                       | 8 700                       | 8 700                        | 7 700                        | 6 200                          | 1.9            | 7.5            | 2 000                | 4 000                |                |                                                                                     |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

**M<sub>2</sub> = 12500 Nm**

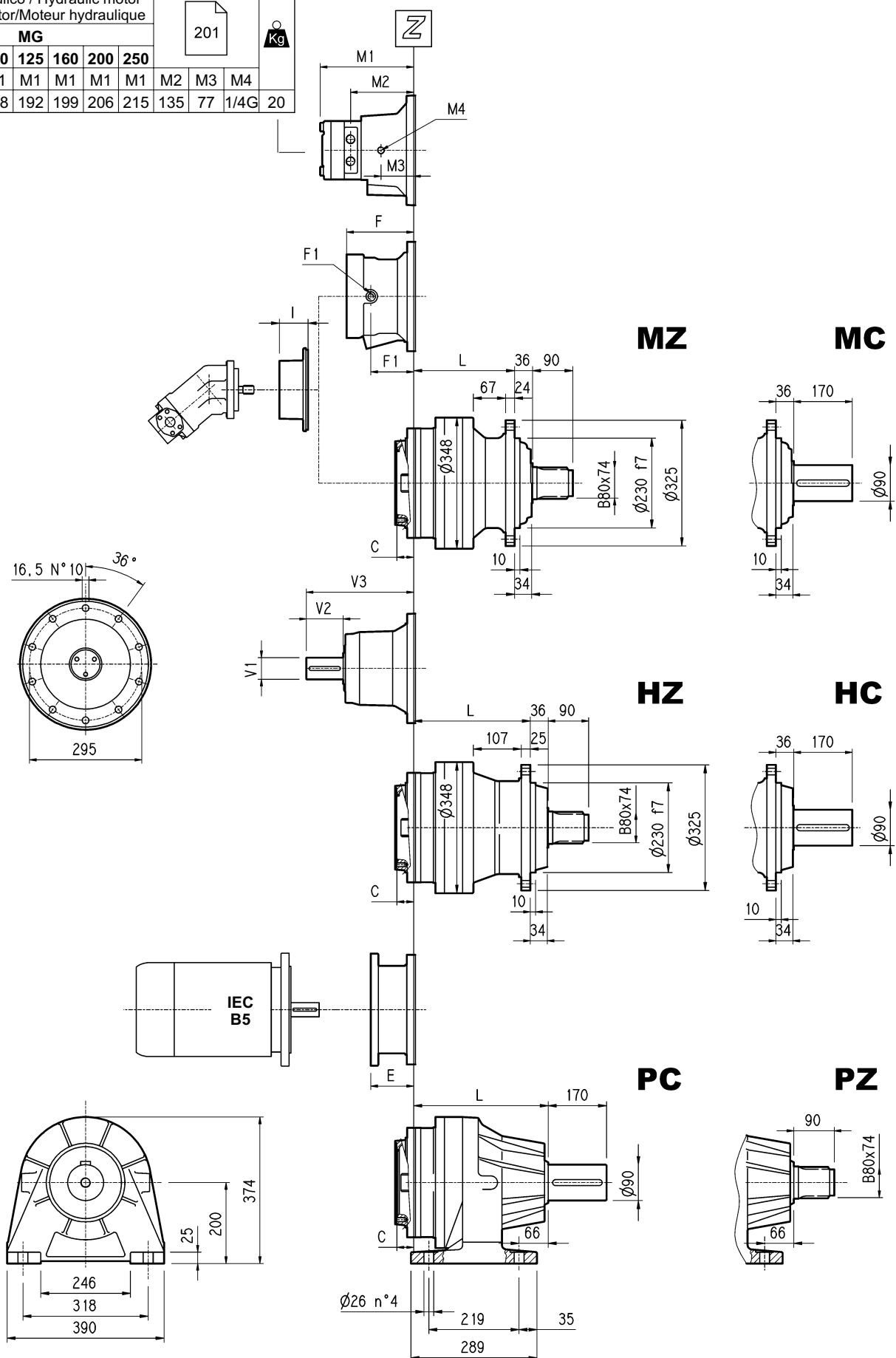
**307R**

|  | i    | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|----------------------------------------------------------------------------------|------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                  |      | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h |                |                |                      |                      |                |                                                                                     |
|                                                                                  | 1:   | 10 000               | 25 000            | 50 000            | 100 000           | 500 000           | 1 000 000         | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>R2</b>                                                                        | 13.0 | 9 000                | 8 500             | 7 600             | 6 800             | 5 300             | 4 250             | 85             | 35             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                  | 15.5 | 11 400               | 9 800             | 8 800             | 7 900             | 5 900             | 4 850             | 85             | 35             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                  | 19.8 | 14 000               | 12 000            | 10 700            | 9 700             | 7 100             | 5 700             | 85             | 35             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                  | 23.5 | 11 000               | 9 600             | 8 700             | 8 700             | 7 700             | 6 200             | 62             | 35             | 1 800                | 3 800                | 500            | 5C                                                                                  |
| <b>R3</b>                                                                        | 31.6 | 9 000                | 9 000             | 9 000             | 7 400             | 4 550             | 3 700             | 35             | 20             | 2 000                | 4 000                | 400            | 4K                                                                                  |
|                                                                                  | 37.7 | 14 800               | 12 600            | 10 300            | 8 300             | 5 100             | 4 150             | 35             | 20             | 2 000                | 4 000                | 440            | 4L                                                                                  |
|                                                                                  | 44.6 | 15 000               | 13 800            | 11 500            | 9 400             | 5 800             | 4 700             | 35             | 20             | 2 000                | 4 000                | 400            | 4K                                                                                  |
|                                                                                  | 55.9 | 15 000               | 13 800            | 12 900            | 11 000            | 6 800             | 5 500             | 35             | 20             | 2 000                | 4 000                | 330            | 4H                                                                                  |
|                                                                                  | 65.0 | 14 500               | 13 800            | 12 900            | 12 200            | 7 500             | 6 100             | 35             | 20             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 71.8 | 14 000               | 12 000            | 10 700            | 10 500            | 7 700             | 6 200             | 30             | 20             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 78.6 | 12 300               | 12 300            | 12 300            | 12 300            | 7 800             | 6 300             | 27             | 20             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 83.4 | 14 000               | 12 000            | 10 700            | 10 500            | 7 700             | 6 200             | 26             | 20             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 99.0 | 11 000               | 9 600             | 8 700             | 8 700             | 7 700             | 6 200             | 17.9           | 20             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 120  | 11 000               | 9 600             | 8 700             | 8 700             | 7 700             | 6 200             | 15.3           | 20             | 2 000                | 4 000                | 160            | 4D                                                                                  |
| <b>R4</b>                                                                        | 152  | 15 000               | 13 800            | 12 900            | 12 500            | 7 900             | 6 400             | 15.0           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 165  | 14 000               | 12 000            | 10 700            | 10 500            | 7 700             | 6 200             | 15.0           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 191  | 15 000               | 13 800            | 12 900            | 12 500            | 7 900             | 6 400             | 15.0           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 206  | 15 000               | 13 800            | 12 900            | 12 500            | 7 900             | 6 400             | 15.0           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 232  | 14 000               | 12 000            | 10 700            | 10 500            | 7 700             | 6 200             | 15.0           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 258  | 15 000               | 13 800            | 12 900            | 12 500            | 7 900             | 6 400             | 15.0           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 284  | 14 000               | 12 000            | 10 700            | 10 500            | 7 700             | 6 200             | 14.9           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 313  | 11 000               | 9 600             | 8 700             | 8 700             | 7 700             | 6 200             | 10.8           | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 331  | 14 000               | 12 000            | 10 700            | 10 500            | 7 700             | 6 200             | 13.1           | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 344  | 14 000               | 12 000            | 10 700            | 10 500            | 7 700             | 6 200             | 12.7           | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 363  | 12 300               | 12 300            | 12 300            | 12 300            | 7 800             | 6 300             | 10.4           | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 413  | 14 000               | 12 000            | 10 700            | 10 500            | 7 700             | 6 200             | 10.9           | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 457  | 11 000               | 9 600             | 8 700             | 8 700             | 7 700             | 6 200             | 7.8            | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 490  | 11 000               | 9 600             | 8 700             | 8 700             | 7 700             | 6 200             | 7.4            | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 581  | 14 000               | 12 000            | 10 700            | 10 500            | 7 700             | 6 200             | 7.8            | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 690  | 11 000               | 9 600             | 8 700             | 8 700             | 7 700             | 6 200             | 7.4            | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

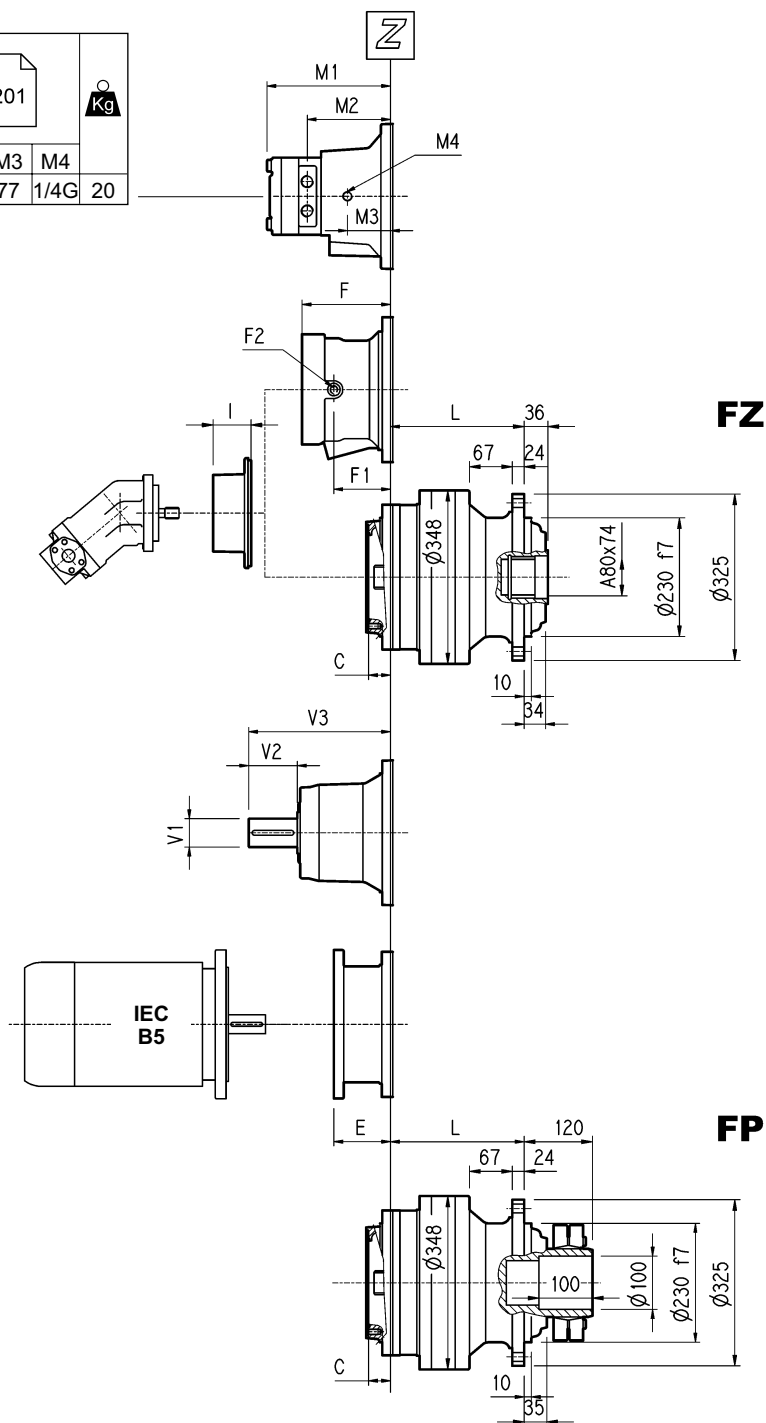
# 307L

|                 |                                                                         |    |     |     |     |     |     |                                                                                       |    |      |                                                                                      |
|-----------------|-------------------------------------------------------------------------|----|-----|-----|-----|-----|-----|---------------------------------------------------------------------------------------|----|------|--------------------------------------------------------------------------------------|
|                 | Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |    |     |     |     |     |     |  201 |    |      |  Kg |
|                 | MG                                                                      |    |     |     |     |     |     |                                                                                       |    |      |                                                                                      |
| cm <sup>3</sup> | 50                                                                      | 80 | 100 | 125 | 160 | 200 | 250 |                                                                                       |    |      |                                                                                      |
|                 | M1                                                                      | M1 | M1  | M1  | M1  | M1  | M1  | M2                                                                                    | M3 | M4   |                                                                                      |
| 307L2           | -                                                                       | -  | 188 | 192 | 199 | 206 | 215 | 135                                                                                   | 77 | 1/4G | 20                                                                                   |



# 307L

|                 |   | Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     |    |      |    |
|-----------------|---|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|----|------|----|
|                 |   | MG                                                                      |     |     |     |     |     |     |    |      |    |
| cm <sup>3</sup> |   | 50                                                                      | 80  | 100 | 125 | 160 | 200 | 250 |    |      |    |
|                 |   | M1                                                                      | M1  | M1  | M1  | M1  | M1  | M1  | M2 | M3   | M4 |
| 307L2           | - | -                                                                       | 188 | 192 | 199 | 206 | 215 | 135 | 77 | 1/4G | 20 |



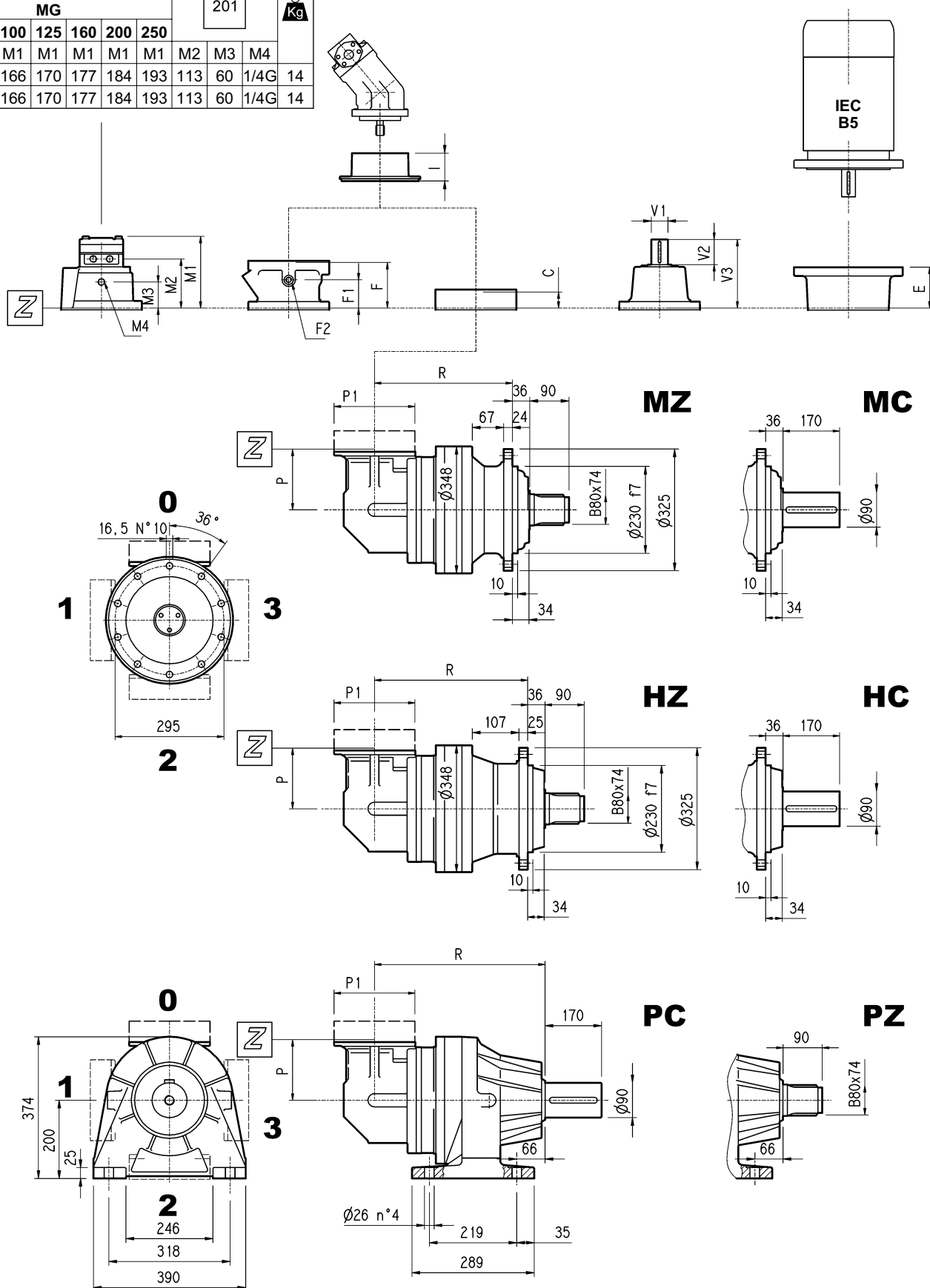
|                                                       |                                                                                                               |           |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-----------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE<br>TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | 18 000 Nm |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-----------|

|        | L     |       |       |       |  |       |       |       |  |                                    |  |  |     |       |                          |                                    |                                                                                       |
|--------|-------|-------|-------|-------|-------------------------------------------------------------------------------------|-------|-------|-------|-------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-------|--------------------------|------------------------------------|---------------------------------------------------------------------------------------|
|        | MZ MC | FZ FP | HZ HC | PC PZ | MZ MC                                                                               | FZ FP | HZ HC | PC PZ | C                                                                                   | Entrata Input<br>Antrieb<br>Entrée | I                                                                                     | F                                                                                     | F1  | F2    | Tipo Type<br>Typ<br>Type | Entrata Input<br>Antrieb<br>Entrée |  |
| 307 L1 | 165   | 165   | 210   | 246   | 95                                                                                  | 85    | 105   | 120   | 51                                                                                  | B                                  |  | 201                                                                                   | 153 | 1/4 G | 6                        | B                                  | 28                                                                                    |
| 307 L2 | 254   | 254   | 299   | 335   | 107                                                                                 | 97    | 117   | 132   | 37                                                                                  | A                                  |                                                                                       | 145                                                                                   | 95  | 1/4 G | 5                        | A                                  | 16                                                                                    |
| 307 L3 | 319   | 319   | 364   | 400   | 114                                                                                 | 104   | 124   | 139   | 37                                                                                  | A                                  |                                                                                       | 105                                                                                   | 65  | 1/4 G | 4                        | A                                  | 10                                                                                    |
| 307 L4 | 372   | 372   | 417   | 453   | 118                                                                                 | 108   | 128   | 143   | 37                                                                                  | A                                  |                                                                                       | 191                                                                                   | 105 | 65    | 1/4 G                    | 4                                  | A                                                                                     |

|        | V1 | V2  | V3    |  | V1 | V2  | V3  |  | E |        |        |        |         |         |         |         |         |         |         |         |
|--------|----|-----|-------|-------------------------------------------------------------------------------------|----|-----|-----|---------------------------------------------------------------------------------------|---|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
|        |    |     |       |                                                                                     |    |     |     |                                                                                       |   | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 | IEC 200 | IEC 225 | IEC 250 |
| 307 L1 | 80 | 130 | 315   | 35                                                                                  | 60 | 105 | 313 | 28                                                                                    |   |        |        |        |         |         |         |         | 195     | 186     | 216     | 215     |
| 307 L2 | 48 | 82  | 239   | 15                                                                                  |    |     |     |                                                                                       |   |        |        |        |         | 114     | 144     |         | 144     | 174     |         |         |
| 307 L3 | 24 | 36  | 137.5 | 6                                                                                   | 38 | 58  | 158 | 7                                                                                     |   | 65     | 84     | 84     | 94      | 94      | 114     | 144     |         |         |         |         |
| 307 L4 | 24 | 36  | 137.5 | 6                                                                                   | 38 | 58  | 158 | 7                                                                                     |   | 65     | 84     | 84     | 94      | 94      | 114     | 144     |         |         |         |         |

# 307R

|       | Motore idraulico / Hydraulic motor<br>Hydraulikmotor/Moteur hydraulique |     |     |     |     |     |     | <div> 201</div> <div> Kg</div> |    |      |    |
|-------|-------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------|----|
|       | MG                                                                      |     |     |     |     |     |     |                                                                                                                                                                                                  |    |      |    |
|       | cm <sup>3</sup>                                                         | 50  | 80  | 100 | 125 | 160 | 200 | 250                                                                                                                                                                                              | M2 | M3   | M4 |
|       | M1                                                                      | M1  | M1  | M1  | M1  | M1  | M1  | M2                                                                                                                                                                                               | M3 | M4   |    |
| 307R2 | -                                                                       | -   | 166 | 170 | 177 | 184 | 193 | 113                                                                                                                                                                                              | 60 | 1/4G | 14 |
| 307R3 | -                                                                       | 162 | 166 | 170 | 177 | 184 | 193 | 113                                                                                                                                                                                              | 60 | 1/4G | 14 |

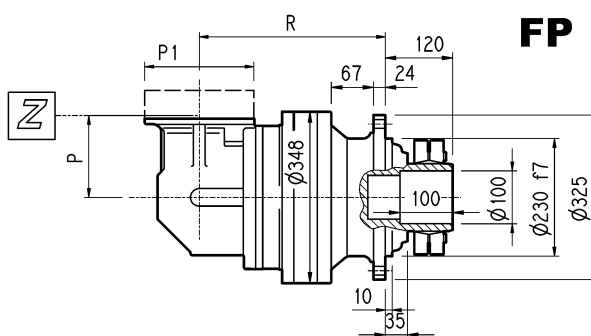
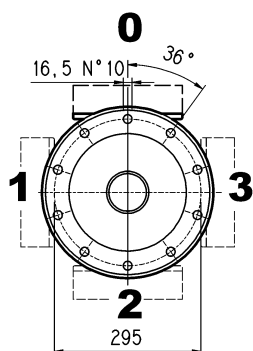
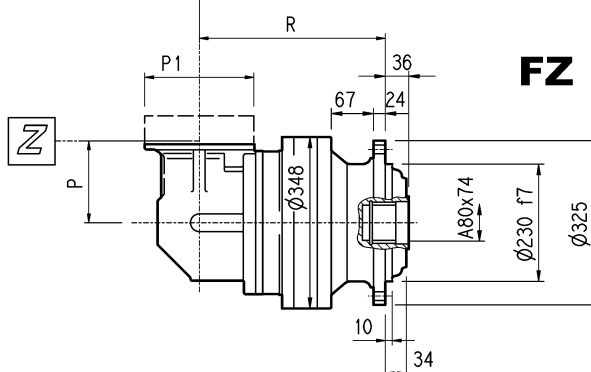


| MG |     |     |     |     | 201 |    |      | Kg |
|----|-----|-----|-----|-----|-----|----|------|----|
| 00 | 125 | 160 | 200 | 250 | M2  | M3 | M4   |    |
| M1 | M1  | M1  | M1  | M1  | M2  | M3 | M4   |    |
| 66 | 170 | 177 | 184 | 193 | 113 | 60 | 1/4G | 14 |
| 66 | 170 | 177 | 184 | 193 | 113 | 60 | 1/4G | 14 |

Technical drawing of the IEC B5 terminal block assembly. The drawing includes a top view, a side view, and a front view. Dimensions are indicated as follows:

- Top View:** Dimensions include  $M1$ ,  $M2$ ,  $M3$ ,  $M4$ ,  $F1$ ,  $F$ ,  $C$ ,  $V1$ ,  $V2$ ,  $V3$ , and  $E$ .
- Side View:** Dimensions include  $M1$ ,  $M2$ ,  $M3$ ,  $M4$ ,  $F1$ ,  $F$ ,  $C$ ,  $V1$ ,  $V2$ ,  $V3$ , and  $E$ .
- Front View:** Dimensions include  $M1$ ,  $M2$ ,  $M3$ ,  $M4$ ,  $F1$ ,  $F$ ,  $C$ ,  $V1$ ,  $V2$ ,  $V3$ , and  $E$ .

The drawing also shows a perspective view of the terminal block assembly, labeled "IEC B5".

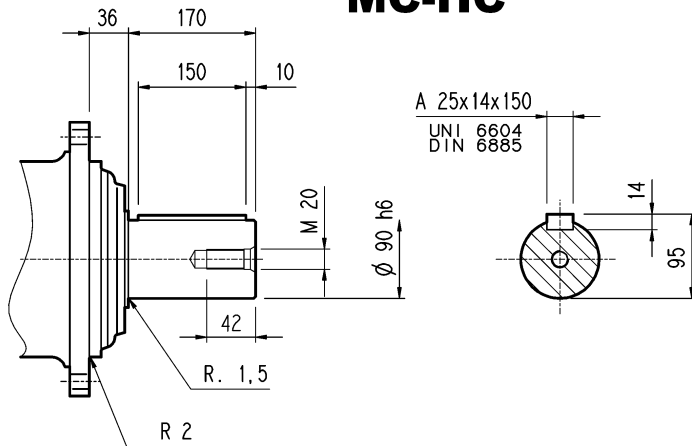


|               | R        |          |          |          | P   | P1  |  |          |          |          |  |                                      |   |  |    |       |                     |                                      |                                                                                       |
|---------------|----------|----------|----------|----------|-----|-----|-------------------------------------------------------------------------------------|----------|----------|----------|-------------------------------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----|-------|---------------------|--------------------------------------|---------------------------------------------------------------------------------------|
|               | MZ<br>MC | FZ<br>FP | HZ<br>HC | PC<br>PZ |     |     | MZ<br>MC                                                                            | FZ<br>FP | HZ<br>HC | PC<br>PZ | C                                                                                   | Entrée<br>Input<br>Antrieb<br>Entrée | I                                                                                     | F                                                                                     | F1 | F2    | Tipo<br>Typ<br>Type | Entrée<br>Input<br>Antrieb<br>Entrée |  |
| <b>307 R2</b> | 284      | 284      | 329      | 365      | 225 | 245 | 145                                                                                 | 135      | 155      | 170      | 37                                                                                  | A                                    |  | 145                                                                                   | 95 | 1/4 G | 5                   | A                                    | 16                                                                                    |
| <b>307 R3</b> | 346      | 346      | 391      | 427      | 140 | 186 | 127                                                                                 | 117      | 137      | 152      | 37                                                                                  | A                                    |                                                                                       | 105                                                                                   | 65 | 1/4 G | 4                   | A                                    | 10                                                                                    |
| <b>307 R4</b> | 411      | 411      | 456      | 492      | 122 | 186 | 128                                                                                 | 118      | 138      | 153      | 37                                                                                  | A                                    |                                                                                       | 105                                                                                   | 65 | 1/4 G | 4                   | A                                    | 10                                                                                    |

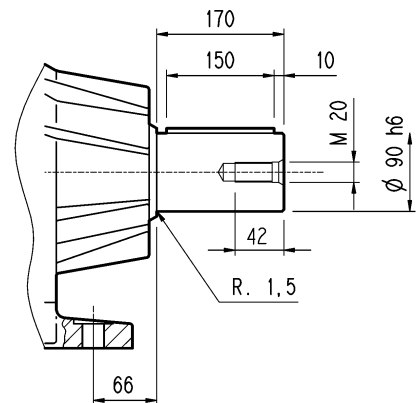
85

# 307L - 307R

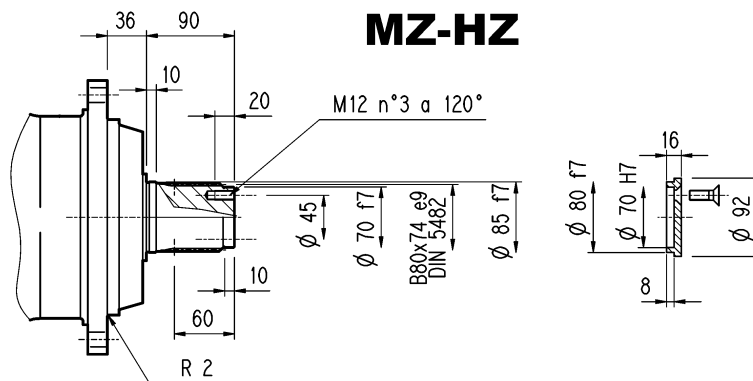
## MC-HC



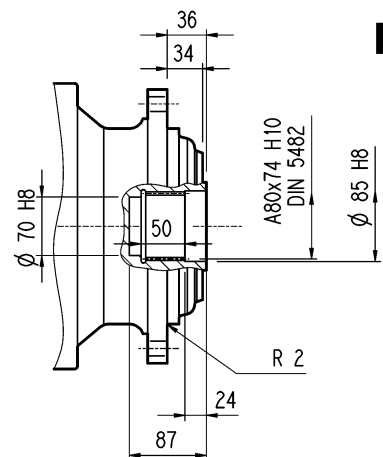
## PC



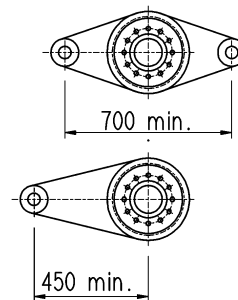
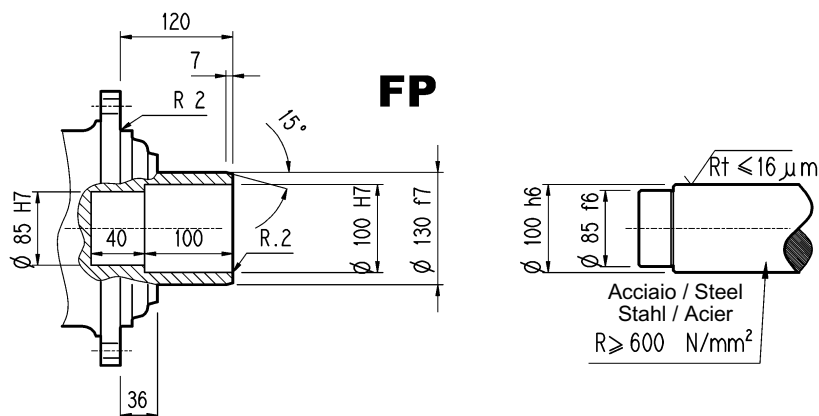
## MZ-HZ



## FZ



## FP

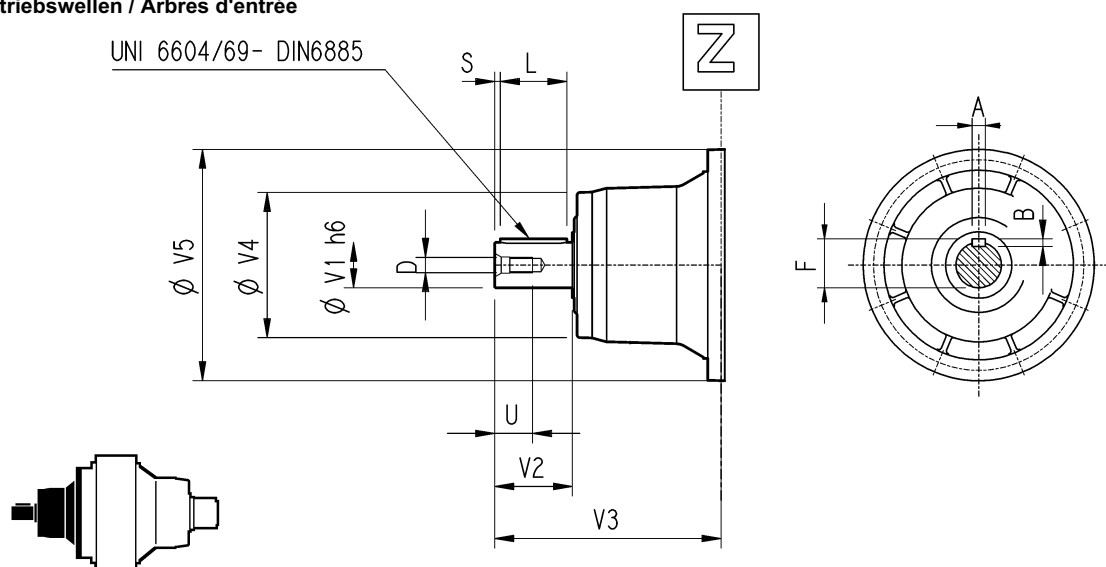


|                                                       |                                                                                                            |           |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | 18 000 Nm |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------|



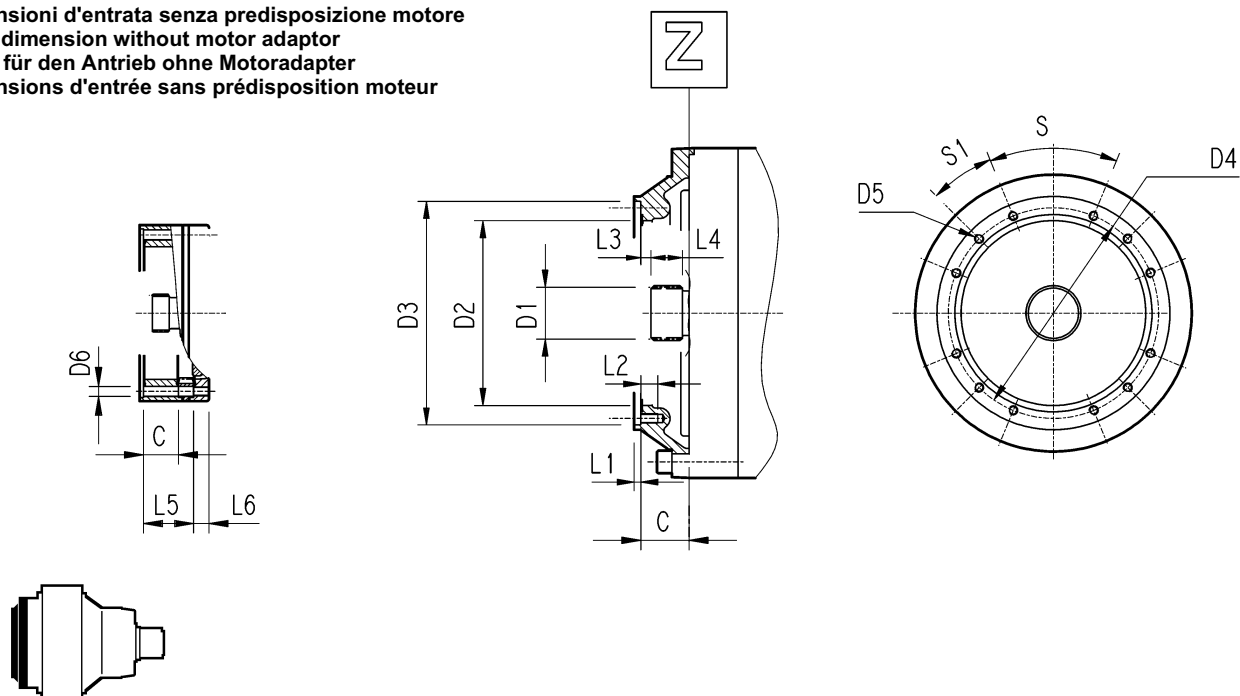
# 307L - 307R

Alberi veloci / Input shaft  
Antriebswellen / Arbres d'entrée



|           | CODE | V1 | V2  | V3    | V4  | V5  | A  | B  | F    | L   | S   | D   | U  |
|-----------|------|----|-----|-------|-----|-----|----|----|------|-----|-----|-----|----|
| 307 L1    | V07B | 80 | 130 | 315   | 200 | 345 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
|           | V07A | 60 | 105 | 313   | 155 | 345 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |
| 307 L2    | V05B | 48 | 82  | 239   | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 307 L3    | V01A | 24 | 36  | 137.5 | 120 | 186 | 8  | 7  | 27   | 30  | 3   | M8  | 19 |
|           | V01B | 38 | 58  | 158   | 120 | 186 | 10 | 8  | 41   | 50  | 4   | M12 | 28 |
| 307 L4    | V01A | 24 | 36  | 137.5 | 120 | 186 | 8  | 7  | 27   | 30  | 3   | M8  | 19 |
|           | V01B | 38 | 58  | 158   | 120 | 186 | 10 | 8  | 41   | 50  | 4   | M12 | 28 |
| 307 R2    | V05B | 48 | 82  | 239   | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 307 R3-R4 | V01A | 24 | 36  | 137.5 | 120 | 186 | 8  | 7  | 27   | 30  | 3   | M8  | 19 |
|           | V01B | 38 | 58  | 158   | 120 | 186 | 10 | 8  | 41   | 50  | 4   | M12 | 28 |

Dimensioni d'entrata senza predisposizione motore  
Input dimension without motor adaptor  
Maße für den Antrieb ohne Motoradapter  
Dimensions d'entrée sans prédisposition moteur



|           | C  | D1             | D2  | D3     | D4  | D5       | D6 | L1 | L2 | L3 | L4 | L5  | L6 | S   | S1    | Entrata<br>Input<br>Antrieb<br>Entrée |
|-----------|----|----------------|-----|--------|-----|----------|----|----|----|----|----|-----|----|-----|-------|---------------------------------------|
| 307 L1    | 51 | 58x53 DIN 5482 | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11 | 22 | /   | /  | 45° | 22.5° | B                                     |
| 307 L2    | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 0  | 4  | 18 | 9  | 18 | 0   | 0  | 45° | 45°   | A                                     |
| 307 L3    | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | 0  | 9  | 18 | 65  | 18 | 45° | 45°   | A                                     |
| 307 L4    | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | 0  | 9  | 18 | 118 | 18 | 45° | 45°   | A                                     |
| 307 R2    | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | 18 | 9  | 18 | 0   | 0  | 45° | 45°   | A                                     |
| 307 R3-R4 | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | /  | 9  | 18 | 37  | 18 | 45° | 45°   | A                                     |

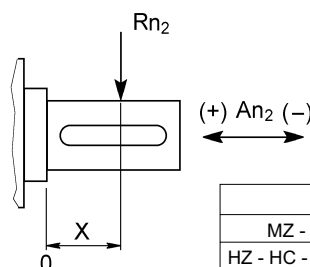
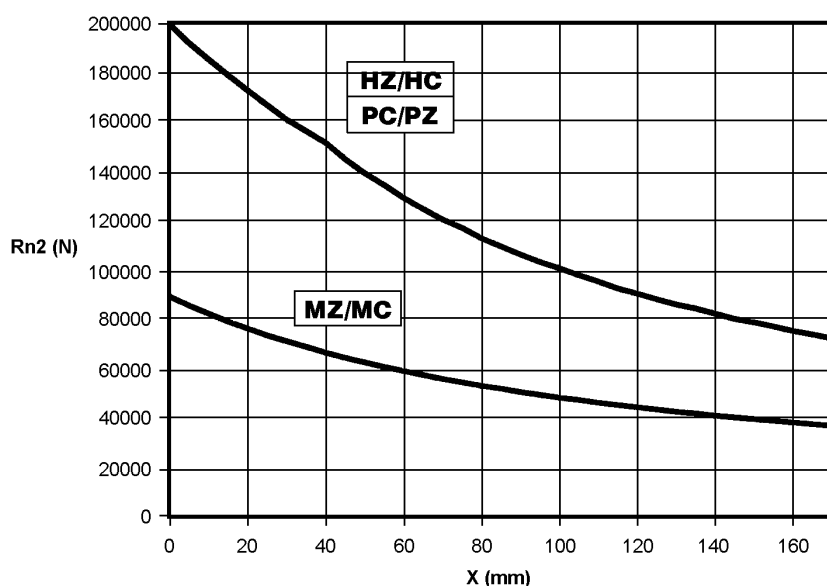
## 307L - 307R

Carichi radiali ed assiali ammissibili sull'albero lento per un valore di  $F_{H2} : n_2 \cdot h = 10\ 000$

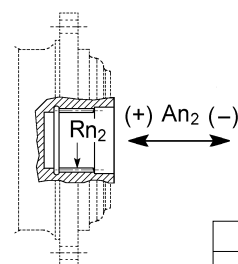
Permissible radial and axial loads on output shaft with  $F_{H2} : n_2 \cdot h = 10\ 000$

An der Ausgangswelle zulässige Radiallasten und Axialkräfte für einen Wert von  $F_{H2} : n_2 \cdot h = 10\ 000$

Charges radiales et axiales admises sur l'arbre lent pour une valeur de  $F_{H2} : n_2 \cdot h = 10\ 000$



|                   | An <sub>2</sub> (+) | An <sub>2</sub> (-) |
|-------------------|---------------------|---------------------|
| MZ - MC           | 90 000              | 50 000              |
| HZ - HC - PC - PZ | 160 000             | 80 000              |



|    | Rn <sub>2</sub> | An <sub>2</sub> (+/-) |
|----|-----------------|-----------------------|
| FZ | 45 000          | 45 000                |

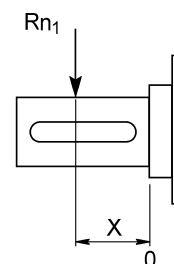
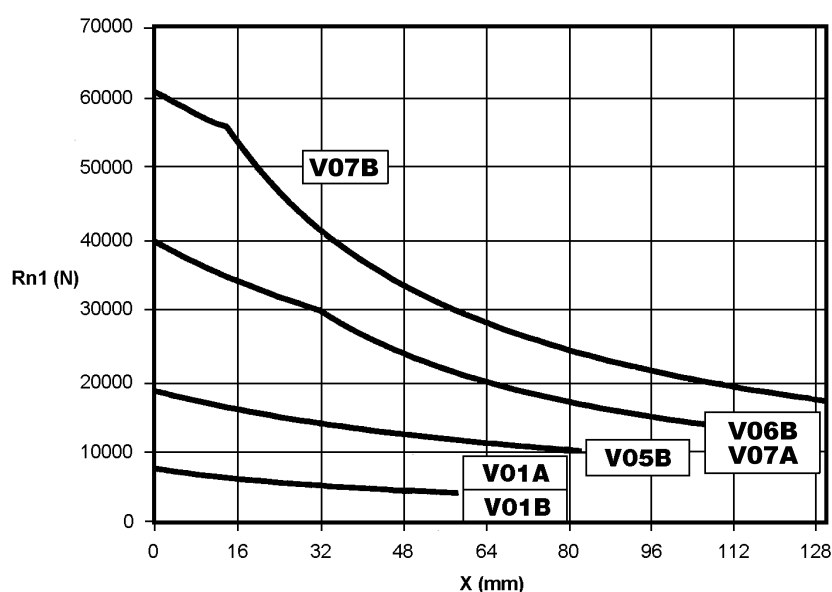
| Fattore fh <sub>2</sub> correttivo per carichi sugli alberi<br>Load corrective factor fh <sub>2</sub> on shafts<br>Korrektionsfaktor fh <sub>2</sub> für wellenbelastungen<br>Facteur de correction fh <sub>2</sub> pour charges sur les arbres | Fh <sub>2</sub> = n <sub>2</sub> · h |                   | 10 000 | 25 000 | 50 000 | 100 000 | 500 000 | 1 000 000 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------|--------|--------|--------|---------|---------|-----------|
|                                                                                                                                                                                                                                                 | fh <sub>2</sub>                      | MZ - MC - FZ      | 1      | 0.74   | 0.58   | 0.46    | 0.27    | 0.21      |
|                                                                                                                                                                                                                                                 |                                      | HZ - HC - PC - PZ | 1      | 0.76   | 0.61   | 0.50    | 0.31    | 0.25      |

Carichi radiali ammissibili sull'albero veloce per un valore di  $F_{H1} : n_1 \cdot h = 250\ 000$

Permissible radial loads on input shaft with  $F_{H1} : n_1 \cdot h = 250\ 000$

An der Antriebswelle zulässige Radiallasten für einen Wert von  $F_{H1} : n_1 \cdot h = 250\ 000$

Charges radiales admises sur l'arbre d'entrée pour une valeur de  $F_{H1} : n_1 \cdot h = 250\ 000$



| Fattore $f_{H1}$ correttivo per carichi sugli alberi<br>Load corrective factor $f_{H1}$ on shafts<br>Korrektionsfaktor $f_{H1}$ für wellenbelastungen<br>Facteur de correction $f_{H1}$ pour charges sur les arbres | $F_{H1} = n_1 \cdot h$ |         |         |           |           |           |            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------|---------|-----------|-----------|-----------|------------|
|                                                                                                                                                                                                                     | $f_{H1}$               | 250 000 | 500 000 | 1 000 000 | 2 000 000 | 5 000 000 | 10 000 000 |
|                                                                                                                                                                                                                     |                        | 1       | 0.79    | 0.63      | 0.50      | 0.37      | 0.29       |

# 309L

**M<sub>2</sub> = 18500 Nm**

|  | i     | M <sub>n2</sub> [Nm]        |                             |                             |                              |                              |                                | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|-----------------------------------------------------------------------------------|-------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                   | 1:    | n <sub>2</sub> ·h<br>10 000 | n <sub>2</sub> ·h<br>25 000 | n <sub>2</sub> ·h<br>50 000 | n <sub>2</sub> ·h<br>100 000 | n <sub>2</sub> ·h<br>500 000 | n <sub>2</sub> ·h<br>1 000 000 | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>L1</b>                                                                         | 3.43  | 13 000                      | 13 000                      | 13 000                      | 13 000                       | 11 200                       | 9 100                          | 130            | 25             | 1 500                | 2 000                | 3 200          | 6L                                                                                  |
|                                                                                   | 4.09  | 22 500                      | 20 600                      | 19 000                      | 16 800                       | 10 400                       | 8 400                          | 130            | 25             | 1 500                | 2 000                | 3 200          | 6L                                                                                  |
|                                                                                   | 5.25  | 21 000                      | 18 100                      | 16 200                      | 16 000                       | 10 700                       | 8 700                          | 130            | 25             | 1 500                | 2 000                | 3 200          | 6L                                                                                  |
|                                                                                   | 6.23  | 17 000                      | 14 400                      | 13 000                      | 13 000                       | 10 400                       | 8 500                          | 130            | 25             | 1 500                | 2 000                | 3 200          | 6L                                                                                  |
| <b>L2</b>                                                                         | 12.3  | 13 000                      | 13 000                      | 13 000                      | 13 000                       | 8 700                        | 7 000                          | 60             | 18             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                   | 14.7  | 17 200                      | 16 700                      | 16 700                      | 13 800                       | 8 500                        | 6 900                          | 60             | 18             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                   | 17.4  | 21 300                      | 20 600                      | 19 000                      | 15 600                       | 9 600                        | 7 800                          | 60             | 18             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                   | 21.8  | 18 000                      | 17 500                      | 17 500                      | 15 200                       | 9 400                        | 7 600                          | 60             | 18             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                   | 25.4  | 14 500                      | 14 300                      | 14 300                      | 14 300                       | 9 200                        | 7 500                          | 60             | 18             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                   | 28.0  | 21 000                      | 18 100                      | 16 200                      | 16 000                       | 10 700                       | 8 700                          | 60             | 18             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                   | 30.7  | 12 300                      | 12 300                      | 12 300                      | 12 300                       | 7 800                        | 6 300                          | 60             | 18             | 1 800                | 3 800                | 630            | 5E                                                                                  |
|                                                                                   | 32.6  | 18 300                      | 18 100                      | 16 200                      | 16 000                       | 10 700                       | 8 700                          | 60             | 18             | 1 800                | 3 800                | 630            | 5E                                                                                  |
|                                                                                   | 38.6  | 17 000                      | 14 400                      | 13 000                      | 13 000                       | 10 400                       | 8 500                          | 57             | 18             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                   | 46.7  | 17 000                      | 14 400                      | 13 000                      | 13 000                       | 10 400                       | 8 500                          | 49             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
| <b>L3</b>                                                                         | 51.3  | 17 200                      | 16 700                      | 16 700                      | 13 800                       | 8 500                        | 6 900                          | 30             | 11             | 2 000                | 4 000                | 400            | 4K                                                                                  |
|                                                                                   | 60.5  | 21 300                      | 20 600                      | 19 000                      | 15 500                       | 9 500                        | 7 700                          | 30             | 11             | 2 000                | 4 000                | 400            | 4K                                                                                  |
|                                                                                   | 74.1  | 21 300                      | 20 600                      | 19 000                      | 15 500                       | 9 500                        | 7 700                          | 30             | 11             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 80.6  | 21 000                      | 18 100                      | 16 200                      | 16 000                       | 10 000                       | 8 200                          | 30             | 11             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 93.0  | 18 000                      | 17 500                      | 17 500                      | 15 200                       | 9 400                        | 7 600                          | 30             | 11             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 100   | 21 300                      | 20 600                      | 18 000                      | 14 600                       | 9 000                        | 7 300                          | 30             | 11             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 113   | 18 300                      | 18 100                      | 16 200                      | 16 000                       | 10 700                       | 8 700                          | 28             | 11             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 126   | 18 000                      | 17 500                      | 17 500                      | 15 200                       | 9 400                        | 7 600                          | 24             | 11             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                   | 139   | 18 300                      | 18 100                      | 16 200                      | 16 000                       | 10 700                       | 8 700                          | 23             | 11             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 162   | 21 000                      | 18 100                      | 16 200                      | 16 000                       | 10 700                       | 8 700                          | 23             | 11             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 177   | 12 300                      | 12 300                      | 12 300                      | 12 300                       | 7 800                        | 6 300                          | 12.0           | 11             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 202   | 21 000                      | 18 100                      | 16 200                      | 16 000                       | 10 700                       | 8 700                          | 15.0           | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 223   | 17 000                      | 14 400                      | 13 000                      | 13 000                       | 10 400                       | 8 500                          | 14.1           | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 239   | 17 000                      | 14 400                      | 13 000                      | 13 000                       | 10 400                       | 8 500                          | 13.3           | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 284   | 15 800                      | 15 800                      | 15 800                      | 15 000                       | 9 200                        | 7 500                          | 10.0           | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 336   | 17 000                      | 14 400                      | 13 000                      | 13 000                       | 10 400                       | 8 500                          | 10.0           | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
| <b>L4</b>                                                                         | 349   | 21 300                      | 20 600                      | 19 000                      | 15 500                       | 9 500                        | 7 700                          | 18.0           | 7.5            | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 411   | 13 000                      | 13 000                      | 13 000                      | 11 500                       | 7 100                        | 5 800                          | 9.4            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 465   | 21 000                      | 18 100                      | 16 200                      | 16 000                       | 10 000                       | 8 200                          | 14.3           | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 513   | 13 000                      | 13 000                      | 13 000                      | 11 500                       | 7 100                        | 5 800                          | 7.5            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 579   | 21 300                      | 20 600                      | 18 000                      | 14 600                       | 9 000                        | 7 300                          | 10.9           | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 654   | 18 300                      | 18 100                      | 16 200                      | 16 000                       | 10 700                       | 8 700                          | 9.5            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 722   | 21 300                      | 20 600                      | 18 000                      | 14 600                       | 9 000                        | 7 300                          | 8.7            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 801   | 18 300                      | 18 100                      | 16 200                      | 16 000                       | 10 700                       | 8 700                          | 8.0            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 906   | 18 000                      | 17 500                      | 17 500                      | 15 200                       | 9 400                        | 7 600                          | 7.1            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 999   | 18 300                      | 18 100                      | 16 200                      | 16 000                       | 10 700                       | 8 700                          | 6.6            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 149 | 17 000                      | 14 400                      | 13 000                      | 13 000                       | 10 400                       | 8 500                          | 5.6            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 274 | 12 300                      | 12 300                      | 12 300                      | 12 300                       | 7 800                        | 6 300                          | 3.6            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 380 | 17 000                      | 14 400                      | 13 000                      | 13 000                       | 10 400                       | 8 500                          | 4.8            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 605 | 17 000                      | 14 400                      | 13 000                      | 13 000                       | 10 400                       | 8 500                          | 4.1            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 723 | 17 000                      | 14 400                      | 13 000                      | 13 000                       | 10 400                       | 8 500                          | 3.9            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 041 | 15 800                      | 15 800                      | 15 800                      | 15 000                       | 9 200                        | 7 500                          | 3.0            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 423 | 17 000                      | 14 400                      | 13 000                      | 13 000                       | 10 400                       | 8 500                          | 2.7            | 7.5            | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

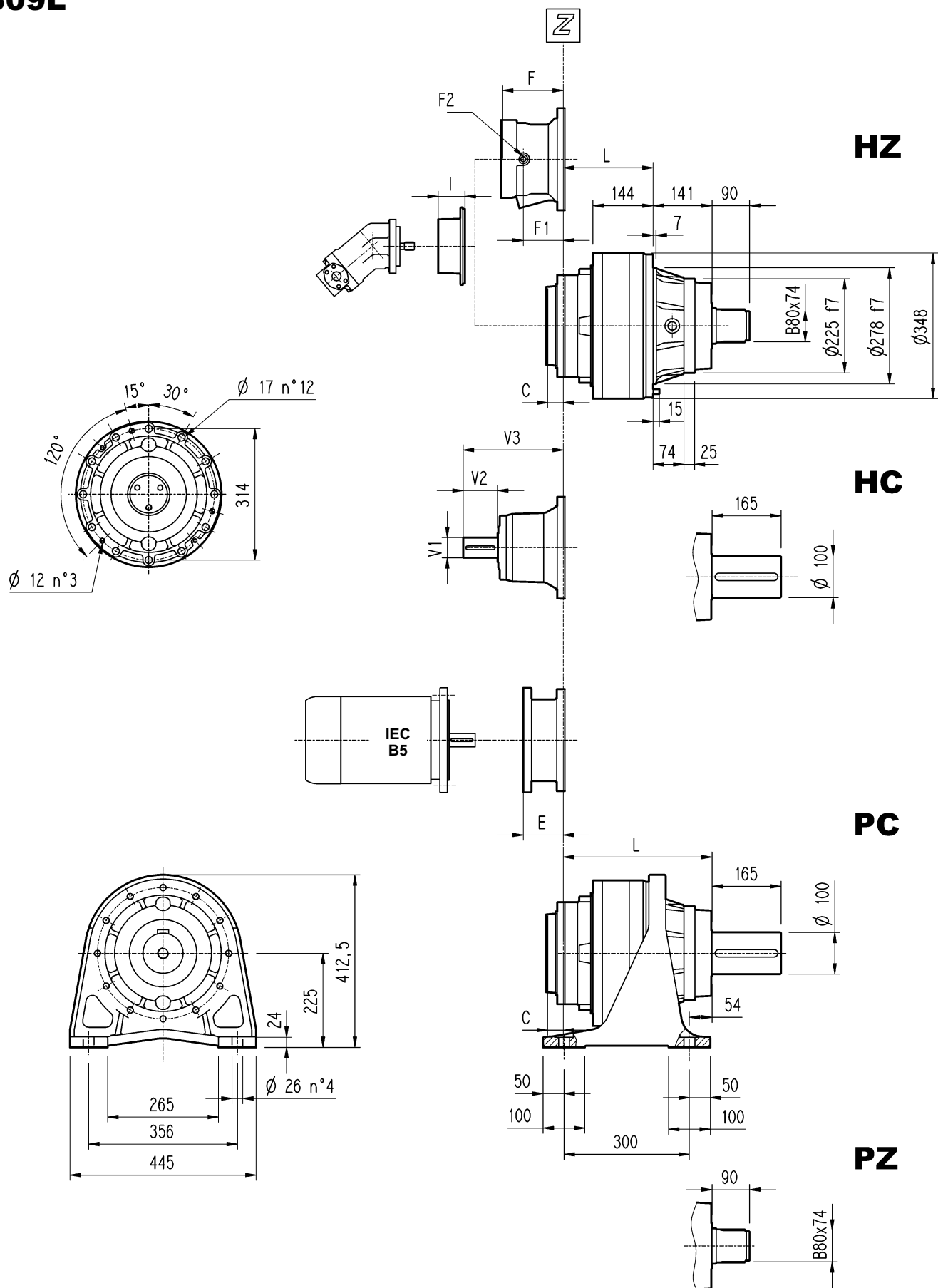
# M<sub>2</sub> = 18500 Nm

# 309R

|  | i    | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|----------------------------------------------------------------------------------|------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                  |      | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h |                |                |                      |                      |                |                                                                                     |
|                                                                                  | 1:   | 10 000               | 25 000            | 50 000            | 100 000           | 500 000           | 1 000 000         | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>R2</b>                                                                        | 13.0 | 9 800                | 8 500             | 7 600             | 6 800             | 5 300             | 4 300             | 85             | 35             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                  | 15.5 | 11 400               | 9 800             | 8 800             | 7 900             | 5 900             | 4 800             | 85             | 35             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                  | 19.8 | 14 000               | 12 100            | 10 800            | 9 700             | 7 100             | 5 700             | 85             | 35             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                  | 23.5 | 16 200               | 14 000            | 12 500            | 11 200            | 8 000             | 6 500             | 85             | 35             | 1 800                | 3 800                | 800            | 5G                                                                                  |
| <b>R3</b>                                                                        | 31.6 | 12 800               | 11 000            | 9 100             | 7 400             | 4 550             | 3 700             | 35             | 20             | 2 000                | 4 000                | 440            | 4L                                                                                  |
|                                                                                  | 37.7 | 14 800               | 12 600            | 10 300            | 8 300             | 5 100             | 4 200             | 35             | 20             | 2 000                | 4 000                | 440            | 4L                                                                                  |
|                                                                                  | 44.6 | 17 100               | 14 100            | 11 500            | 9 400             | 5 800             | 4 700             | 35             | 20             | 2 000                | 4 000                | 400            | 4K                                                                                  |
|                                                                                  | 55.9 | 18 000               | 16 600            | 13 500            | 11 000            | 6 800             | 5 500             | 35             | 20             | 2 000                | 4 000                | 400            | 4K                                                                                  |
|                                                                                  | 65.0 | 14 500               | 14 300            | 14 300            | 12 200            | 7 500             | 6 100             | 35             | 20             | 2 000                | 4 000                | 260            |                                                                                     |
|                                                                                  | 71.8 | 21 000               | 18 100            | 16 100            | 13 100            | 8 100             | 6 500             | 35             | 20             | 2 000                | 4 000                | 330            | 4H                                                                                  |
|                                                                                  | 78.6 | 12 300               | 12 300            | 12 300            | 12 300            | 7 800             | 6 300             | 27             | 20             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 83.4 | 18 300               | 18 100            | 16 200            | 14 500            | 9 000             | 7 300             | 35             | 20             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 99.0 | 17 000               | 14 400            | 13 000            | 13 000            | 10 100            | 8 200             | 27             | 20             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 120  | 17 000               | 14 400            | 13 000            | 13 000            | 10 400            | 8 500             | 23             | 20             | 2 000                | 4 000                | 160            | 4D                                                                                  |
| <b>R4</b>                                                                        | 152  | 21 300               | 20 600            | 18 000            | 14 600            | 9 000             | 7 300             | 15.0           | 14             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 165  | 21 000               | 18 100            | 16 200            | 15 100            | 9 300             | 7 500             | 15.0           | 14             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 191  | 18 000               | 17 500            | 17 500            | 15 200            | 9 400             | 7 600             | 15.0           | 14             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 206  | 21 300               | 20 600            | 18 000            | 14 600            | 9 000             | 7 300             | 15.0           | 14             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 232  | 18 300               | 18 100            | 16 200            | 16 000            | 10 700            | 8 700             | 15.0           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 258  | 18 000               | 17 500            | 17 500            | 15 200            | 9 400             | 7 600             | 15.0           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 284  | 18 300               | 18 100            | 16 200            | 16 000            | 10 700            | 8 700             | 15.0           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 313  | 17 000               | 14 400            | 13 000            | 13 000            | 10 400            | 8 500             | 15.0           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 331  | 21 000               | 18 100            | 16 200            | 16 000            | 10 700            | 8 700             | 15.0           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 363  | 12 300               | 12 300            | 12 300            | 12 300            | 7 800             | 6 300             | 10.4           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 413  | 21 000               | 18 100            | 16 200            | 16 000            | 10 700            | 8 700             | 15.0           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 457  | 17 000               | 14 400            | 13 000            | 13 000            | 10 400            | 8 500             | 12.3           | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 490  | 17 000               | 14 400            | 13 000            | 13 000            | 10 400            | 8 500             | 11.6           | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 581  | 15 800               | 15 800            | 15 800            | 15 000            | 9 200             | 7 500             | 8.7            | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 690  | 17 000               | 14 400            | 13 000            | 13 000            | 10 400            | 8 500             | 8.7            | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

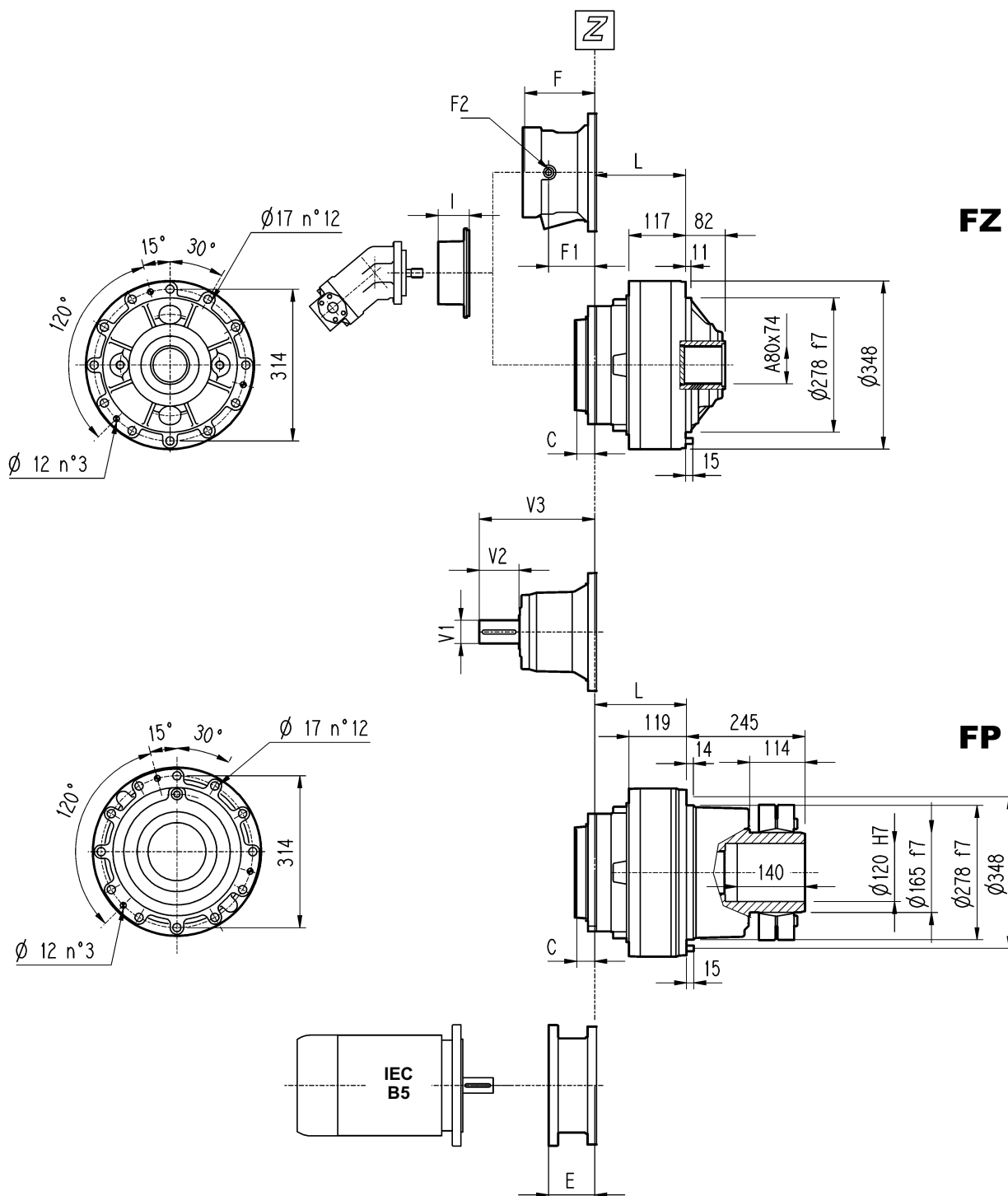
# 309L



**309L**

**FZ**

**FP**

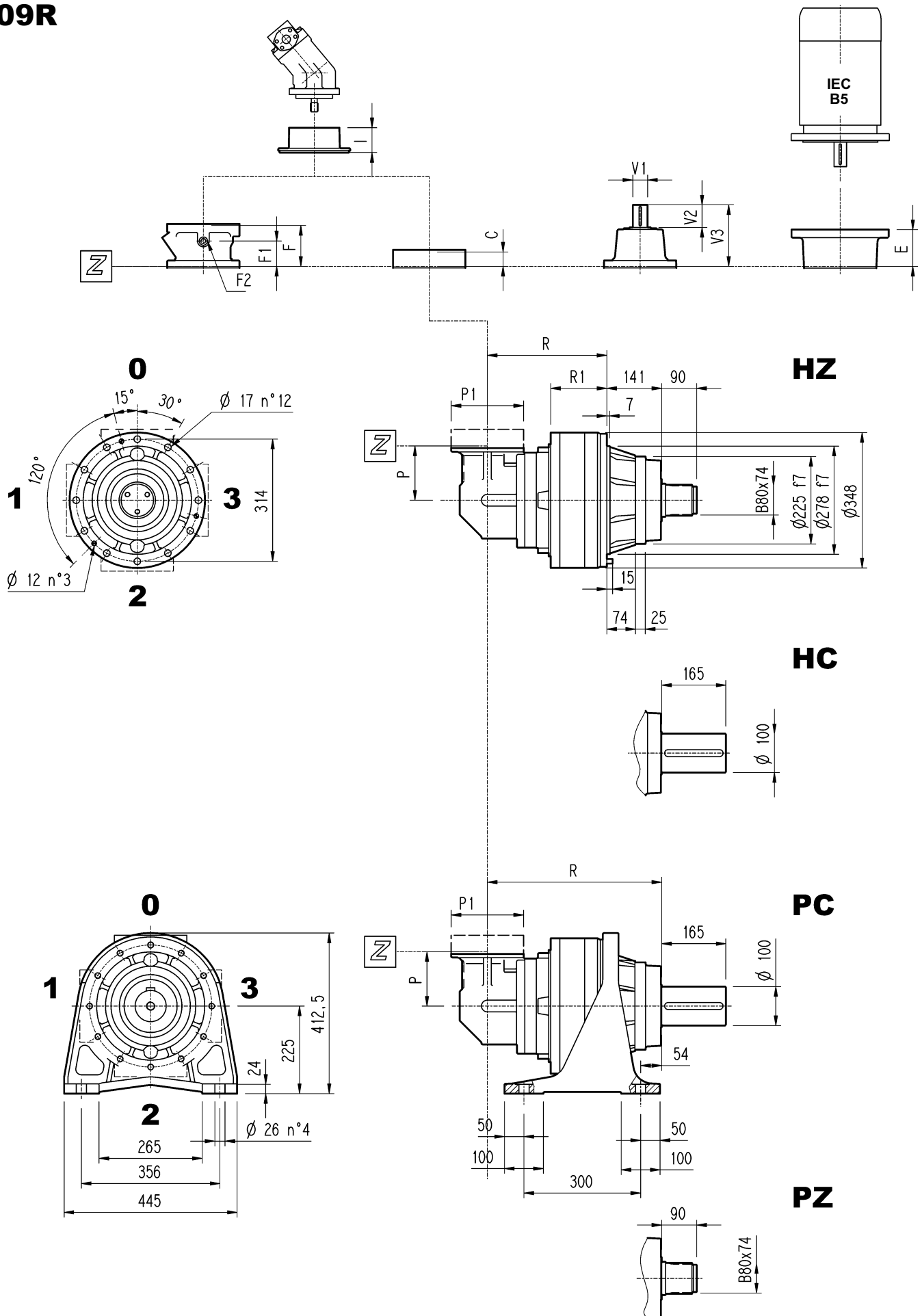


|                                                       |                                                                                                            |                  |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | <b>25 000 Nm</b> |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------|

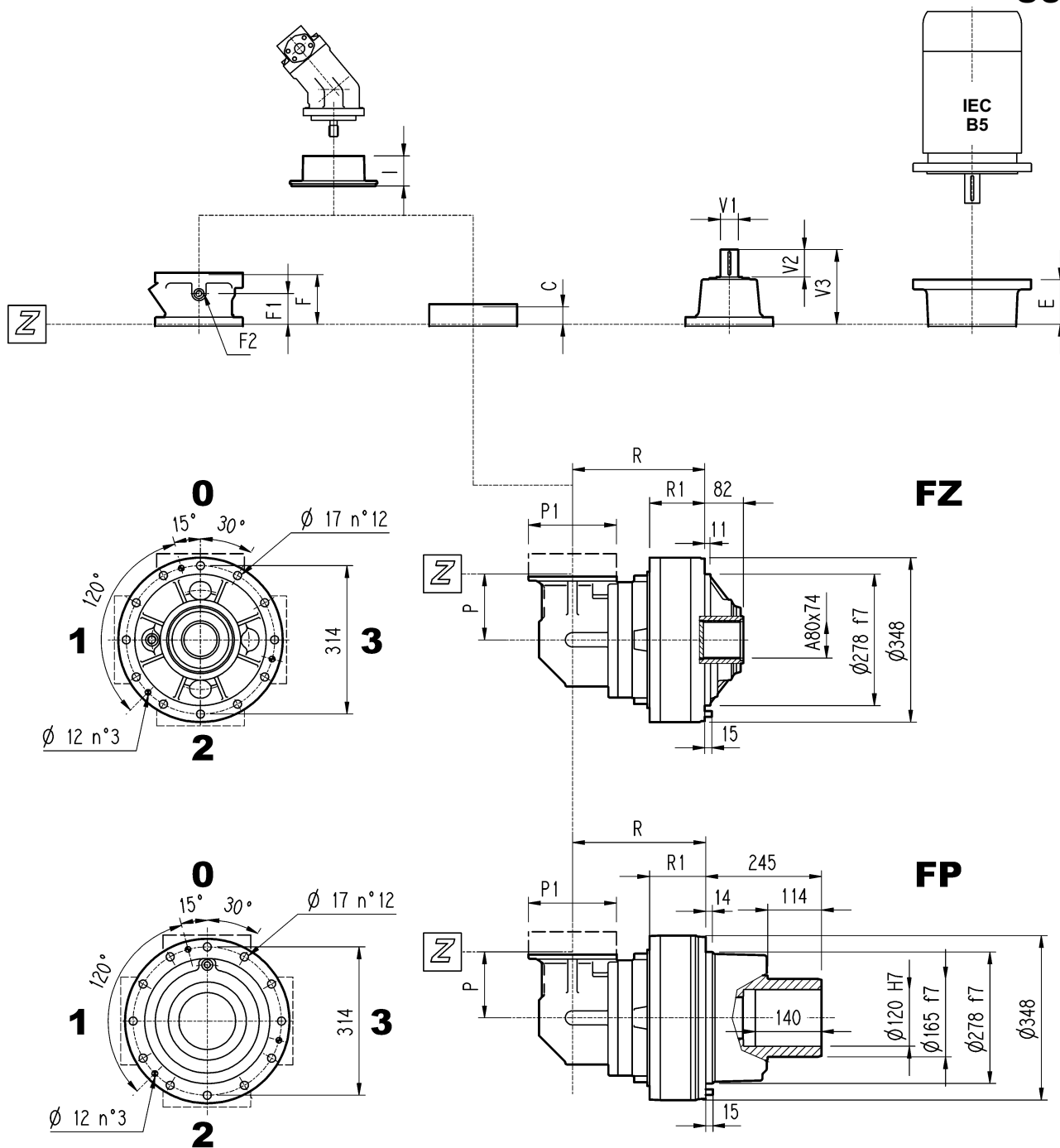
|               | L        |          |     |     | Kg       |          |     |     |    |                                       |     |     |     |       |                             |                                       | Kg |
|---------------|----------|----------|-----|-----|----------|----------|-----|-----|----|---------------------------------------|-----|-----|-----|-------|-----------------------------|---------------------------------------|----|
|               | HZ<br>HC | PC<br>PZ | FZ  | FP  | HZ<br>HC | PC<br>PZ | FZ  | FP  | C  | Entrata<br>Input<br>Antrieb<br>Entrée | I   | F   | F1  | F2    | Tipo<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |    |
| <b>309 L1</b> | 126      | 267      | 99  | 101 | 115      | 130      | 95  | 100 | 51 | B                                     | 191 | 201 | 153 | 1/4 G | 6                           | B                                     | 28 |
| <b>309 L2</b> | 215      | 356      | 188 | 190 | 127      | 142      | 107 | 112 | 37 | A                                     |     | 145 | 95  | 1/4 G | 5                           | A                                     | 16 |
| <b>309 L3</b> | 280      | 421      | 253 | 255 | 134      | 149      | 114 | 119 | 37 | A                                     |     | 105 | 65  | 1/4 G | 4                           | A                                     | 10 |
| <b>309 L4</b> | 333      | 474      | 306 | 308 | 138      | 153      | 118 | 123 | 37 | A                                     |     | 105 | 65  | 1/4 G | 4                           | A                                     | 10 |

|        | V1 | V2  | V3    |  | V1 | V2  | V3  |  | E  |        |        |        |         |         |         |         |         |         |         |         |
|--------|----|-----|-------|-------------------------------------------------------------------------------------|----|-----|-----|---------------------------------------------------------------------------------------|----|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
|        |    |     |       |                                                                                     |    |     |     |                                                                                       |    | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 | IEC 200 | IEC 225 | IEC 250 |
| 309 L1 | 80 | 130 | 315   | 35                                                                                  | 60 | 105 | 313 | 28                                                                                    |    |        |        |        |         |         |         |         | 195     | 186     | 216     | 215     |
| 309 L2 | 48 | 82  | 239   | 15                                                                                  |    |     |     |                                                                                       |    |        |        |        |         | 114     | 144     | 144     | 174     |         |         |         |
| 309 L3 | 24 | 36  | 137.5 | 6                                                                                   | 38 | 58  | 158 | 7                                                                                     | 65 | 84     | 84     | 94     | 94      | 114     | 144     |         |         |         |         |         |
| 309 L4 | 24 | 36  | 137.5 | 6                                                                                   | 38 | 58  | 158 | 7                                                                                     | 65 | 84     | 84     | 94     | 94      | 114     | 144     |         |         |         |         |         |

# 309R



# 309R

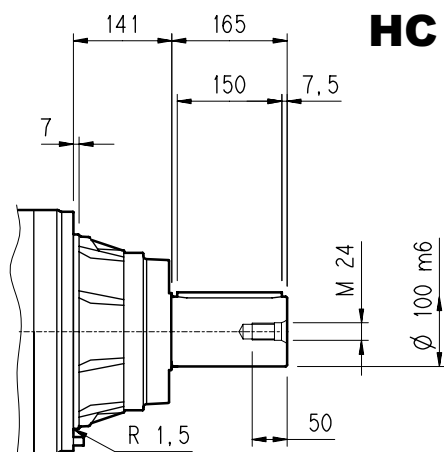


|             |                           |           |
|-------------|---------------------------|-----------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 25 000 Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |           |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |           |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |           |

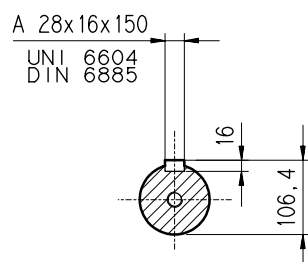
|        | R        |          |     |     | R1       |     |     | P   | P1  |  |          |     |     |  |                                        |         |  |    |       |                             |                                        |                                                                                       |  |
|--------|----------|----------|-----|-----|----------|-----|-----|-----|-----|-------------------------------------------------------------------------------------|----------|-----|-----|---------------------------------------------------------------------------------------|----------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----|-------|-----------------------------|----------------------------------------|---------------------------------------------------------------------------------------|--|
|        | HZ<br>HC | PC<br>PZ | FZ  | FP  | HZ<br>HC | FZ  | FP  |     |     | HZ<br>HC                                                                            | PC<br>PZ | FZ  | FP  | C                                                                                     | Entrat<br>a Input<br>Antrieb<br>Entrée | I                                                                                            | F                                                                                     | F1 | F2    | Typo<br>Type<br>Typ<br>Type | Entrat<br>a Input<br>Antrieb<br>Entrée |  |  |
| 309 R2 | 245      | 386      | 218 | 220 | 168      | 141 | 143 | 225 | 245 | 165                                                                                 | 180      | 145 | 150 | 37                                                                                    | A                                      | <br>191 | 145                                                                                   | 95 | 1/4 G | 5                           | A                                      | 16                                                                                    |  |
| 309 R3 | 307      | 448      | 280 | 282 | 144      | 117 | 119 | 140 | 186 | 147                                                                                 | 162      | 127 | 132 | 37                                                                                    | A                                      |                                                                                              | 105                                                                                   | 65 | 1/4 G | 4                           | A                                      | 10                                                                                    |  |
| 309 R4 | 372      | 513      | 345 | 347 | 144      | 117 | 119 | 122 | 186 | 148                                                                                 | 163      | 128 | 133 | 37                                                                                    | A                                      |                                                                                              | 105                                                                                   | 65 | 1/4 G | 4                           | A                                      | 10                                                                                    |  |

|        | V1 | V2 | V3    |  | V1 | V2 | V3  |  | E  |        |        |        |         |         |         |         |         |
|--------|----|----|-------|-------------------------------------------------------------------------------------|----|----|-----|---------------------------------------------------------------------------------------|----|--------|--------|--------|---------|---------|---------|---------|---------|
|        |    |    |       |                                                                                     |    |    |     |                                                                                       |    | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 |
| 309 R2 | 48 | 82 | 239   | 15                                                                                  |    |    |     |                                                                                       |    |        |        |        |         | 114     | 144     | 144     | 174     |
| 309 R3 | 24 | 36 | 137.5 | 6                                                                                   | 38 | 58 | 158 | 7                                                                                     | 65 | 84     | 84     | 94     | 94      | 114     | 144     |         |         |
| 309 R4 | 24 | 36 | 137.5 | 6                                                                                   | 38 | 58 | 158 | 7                                                                                     | 65 | 84     | 84     | 94     | 94      | 114     | 144     |         |         |

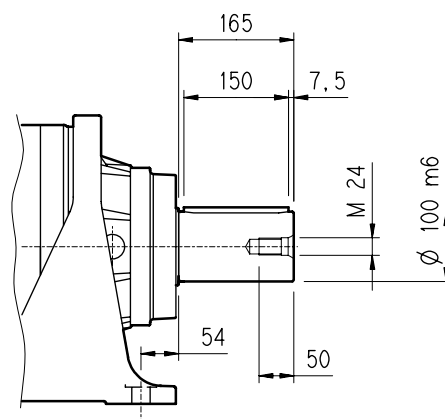
# 309L - 309R



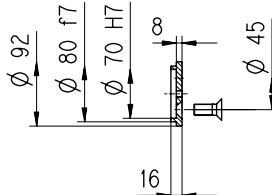
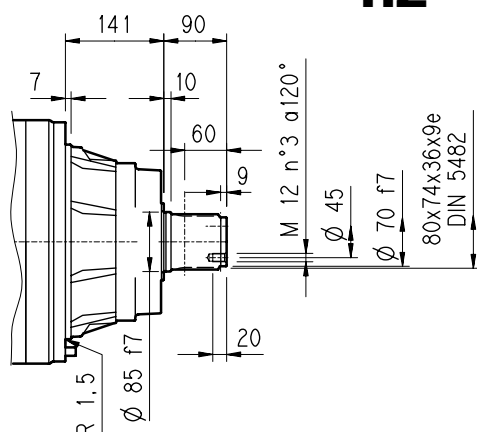
**HC**



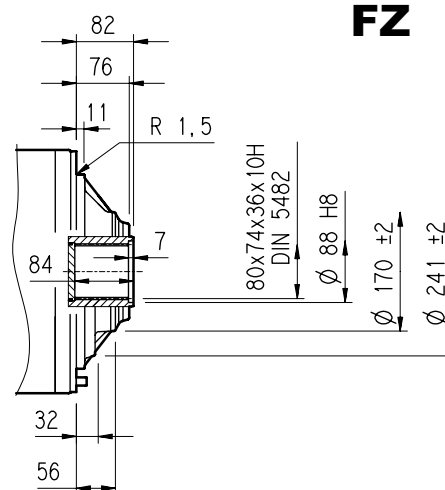
**PC**



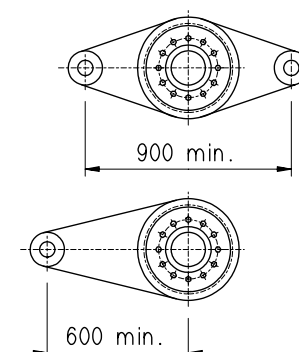
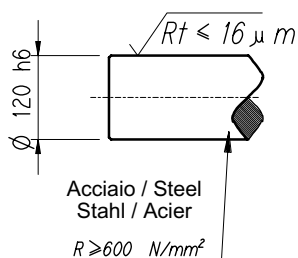
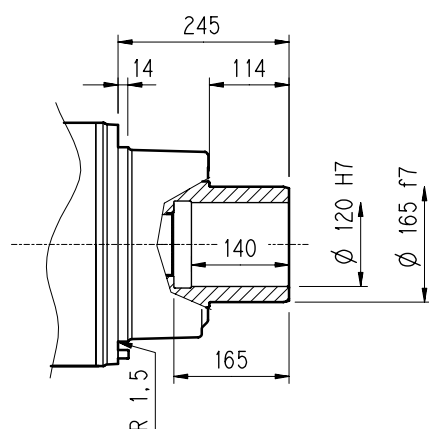
**HZ**



**FZ**

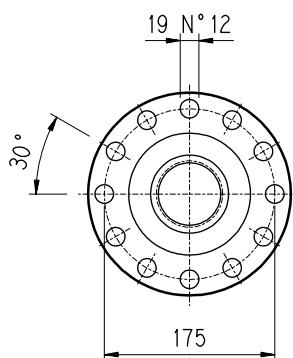
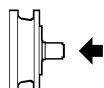


**FP**



|                                                       |                                                                                                            |           |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | 25 000 Nm |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------|

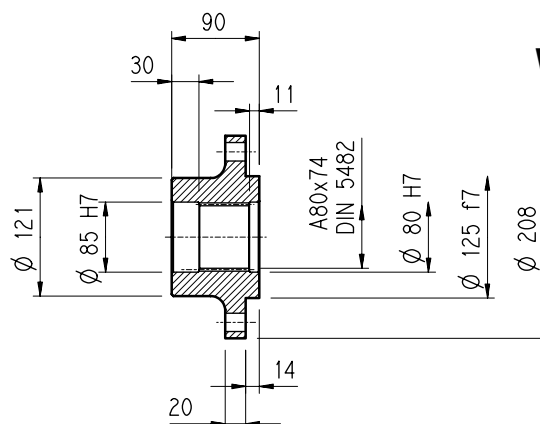
**Flangia / Flange**  
**Flansch / Brides**



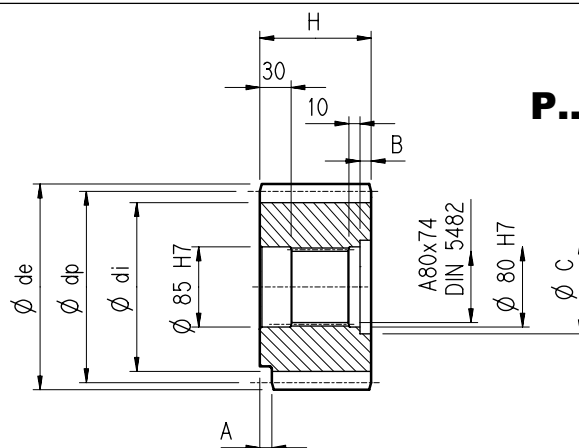
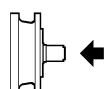
Materiale : Acciaio C40  
Material : Steel C40  
Material : Stahl C40  
M teriel : Acier C40

**309L - 309R**

**W0A**



**Pignoni per rotazione / Output pinions**  
**Ritzel / Pignons**

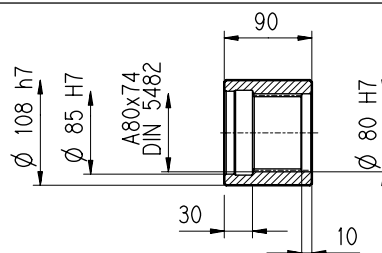
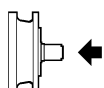


**P...**

|      | m  | z  | x     | dp  | di  | de    | H   | A  | B  | C   | ★ |
|------|----|----|-------|-----|-----|-------|-----|----|----|-----|---|
| PFG  | 8  | 16 | 0.500 | 128 | 117 | 149.5 | 90  | 0  | 0  | 0   | ■ |
| PHC  | 10 | 12 | 0.450 | 120 | 104 | 145   | 90  | 0  | 0  | 0   | ■ |
| PHE  | 10 | 14 | 0.320 | 140 | 121 | 162.5 | 116 | 13 | 26 | 95  | ■ |
| PHF  | 10 | 15 | 0.150 | 150 | 130 | 171.5 | 107 | 20 | 17 | 100 | ■ |
| PHG  | 10 | 16 | 0.500 | 160 | 145 | 186   | 90  | 0  | 0  | 0   | □ |
| PHH1 | 10 | 17 | 0     | 170 | 145 | 190   | 90  | 0  | 0  | 0   | □ |
| PHH2 | 10 | 17 | 0.500 | 170 | 154 | 198   | 90  | 0  | 0  | 0   | □ |
| PLD  | 12 | 13 | 0.500 | 156 | 138 | 192   | 102 | 0  | 12 | 95  | ■ |
| PLE  | 12 | 14 | 0.500 | 168 | 150 | 199.2 | 90  | 0  | 0  | 0   | ■ |
| PLI  | 12 | 18 | 0.500 | 216 | 198 | 249.6 | 107 | 7  | 17 | 95  | ■ |
| PLT  | 12 | 26 | 0     | 312 | 282 | 336   | 90  | 10 | 0  | 0   | □ |

| ★ | Materiale/Material/Material/M teriel                                                                                                                   |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| ■ | Acciaio 39NiCrMo3 Bonificato<br>Steel 39NiCrMo3 hardened and tempered<br>Verg teter Stahl 39NiCrMo3<br>Acier bonifi  39NiCrMo3                         |
| □ | Acciaio 18NiCrMo5 Cementato e temprato<br>Steel 18NiCrMo5 Case hardened<br>Einsatzstahl 18NiCrMo5 Einsatzgeh rtet<br>Acier cement  et tempr  18NiCrMo5 |

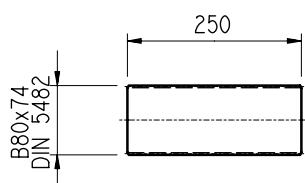
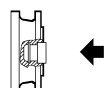
**Manicotti lisci / Sleeve couplings**  
**Naben / Manchons lisses a cannelure interieure**



**MOA**

Materiale : Acciaio 16CrNi4  
Material : Steel 16CrNi4  
Material : Stahl 16CrNi4  
M teriel : Acier 16CrNi4

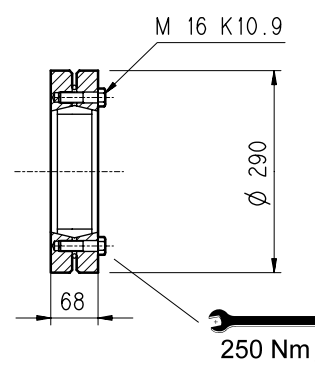
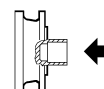
**Barre scanalate / Splined bars**  
**Vielkeilwellen / Barre cannel e**



**B0A**

Mat. acciaio 18NiCrMo5 UNI 5331 da cementare e temprare 50-55 HRC  
Case hardening steel 18NiCrMo5 UNI 5331  
must be case hardened 50-55 HRC  
Material: Einsatzstahl 18NiCrMo5 UNI 5331  
muss einsatzgeh rtet werden 50-55 HRC  
Acier 18 NiCrMo5 UNI 5331 doit  tre c ment  tremp  50-55 HRC

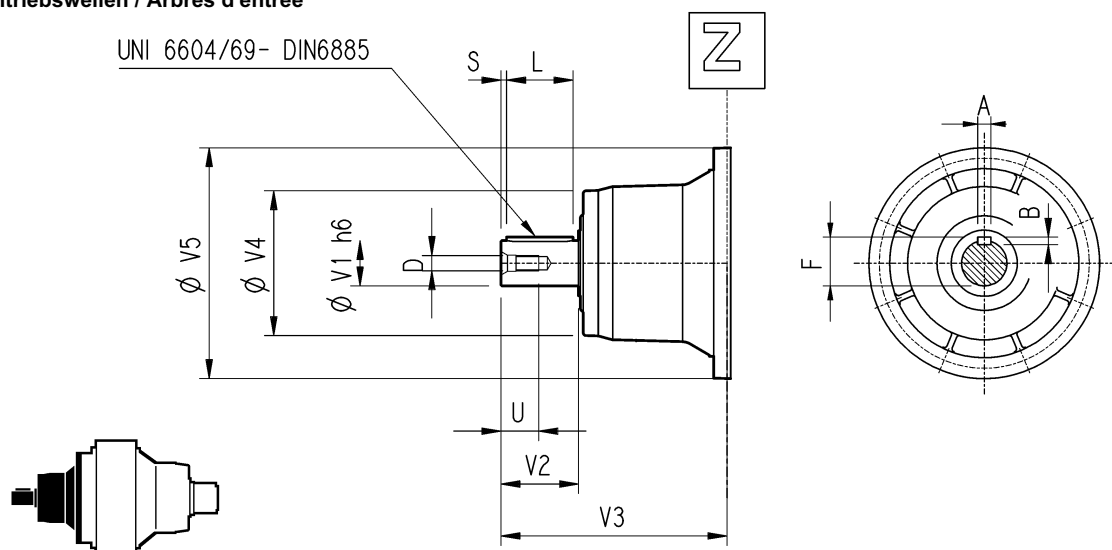
**Giunto ad attrito / Shrink disc**  
**Schrumpfscheibe / Frette de serrage**



**G0A**

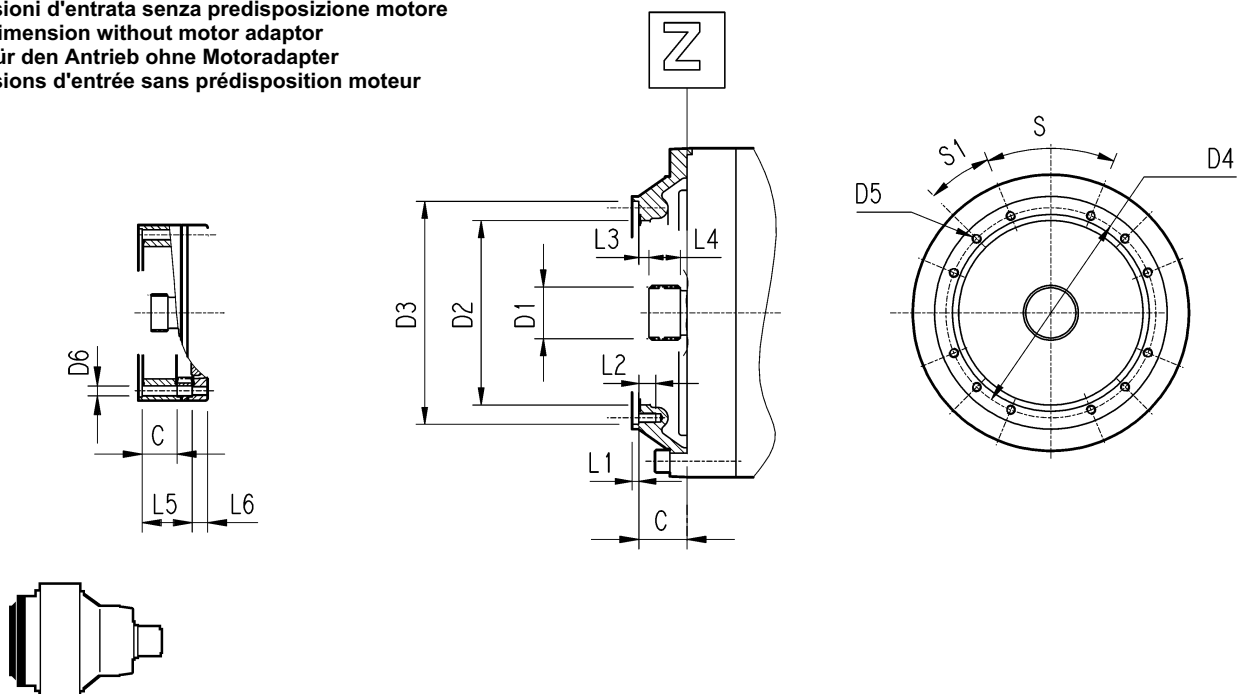
# 309L - 309R

Alberi veloci / Input shaft  
Antriebswellen / Arbres d'entrée



|           | CODE | V1 | V2  | V3    | V4  | V5  | A  | B  | F    | L   | S   | D   | U  |
|-----------|------|----|-----|-------|-----|-----|----|----|------|-----|-----|-----|----|
| 309 L1    | V07B | 80 | 130 | 315   | 200 | 345 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
|           | V07A | 60 | 105 | 313   | 155 | 345 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |
| 309 L2    | V05B | 48 | 82  | 239   | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 309 L3    | V01A | 24 | 36  | 137.5 | 120 | 186 | 8  | 7  | 27   | 30  | 3   | M8  | 19 |
|           | V01B | 38 | 58  | 158   | 120 | 186 | 10 | 8  | 41   | 50  | 4   | M12 | 28 |
| 309 L4    | V01A | 24 | 36  | 137.5 | 120 | 186 | 8  | 7  | 27   | 30  | 3   | M8  | 19 |
|           | V01B | 38 | 58  | 158   | 120 | 186 | 10 | 8  | 41   | 50  | 4   | M12 | 28 |
| 309 R2    | V05B | 48 | 82  | 239   | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 309 R3-R4 | V01A | 24 | 36  | 137.5 | 120 | 186 | 8  | 7  | 27   | 30  | 3   | M8  | 19 |
|           | V01B | 38 | 58  | 158   | 120 | 186 | 10 | 8  | 41   | 50  | 4   | M12 | 28 |

Dimensioni d'entrata senza predisposizione motore  
Input dimension without motor adaptor  
Maße für den Antrieb ohne Motoradapter  
Dimensions d'entrée sans prédisposition moteur



|           | C  | D1             | D2  | D3     | D4  | D5       | D6 | L1 | L2 | L3 | L4 | L5  | L6 | S   | S1    | Entrata<br>Input<br>Antrieb<br>Entrée |
|-----------|----|----------------|-----|--------|-----|----------|----|----|----|----|----|-----|----|-----|-------|---------------------------------------|
| 309 L1    | 51 | 58x53 DIN 5482 | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11 | 22 | /   | /  | 45° | 22.5° | B                                     |
| 309 L2    | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 0  | 4  | 18 | 9  | 18 | 0   | 0  | 45° | 45°   | A                                     |
| 309 L3    | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | 0  | 9  | 18 | 65  | 18 | 45° | 45°   | A                                     |
| 309 L4    | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | 0  | 9  | 18 | 118 | 18 | 45° | 45°   | A                                     |
| 309 R2    | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | 18 | 9  | 18 | 0   | 0  | 45° | 45°   | A                                     |
| 309 R3-R4 | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | /  | 9  | 18 | 37  | 18 | 45° | 45°   | A                                     |

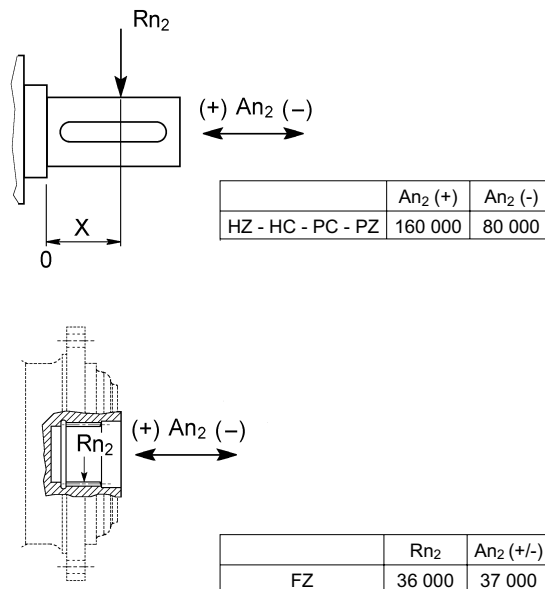
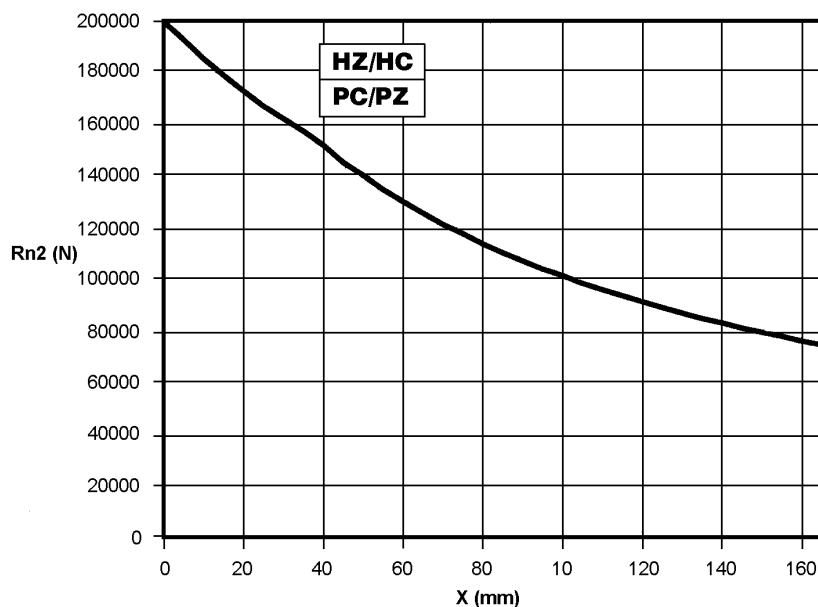
## 309L - 309R

Carichi radiali ed assiali ammissibili sull'albero lento per un valore di  $Fh_2 : n_2 \cdot h = 10\ 000$

Permissible radial and axial loads on output shaft with  $Fh_2 : n_2 \cdot h = 10\ 000$

An der Ausgangswelle zulässige Radiallasten und Axialkräfte für einen Wert von  $Fh_2 : n_2 \cdot h = 10\ 000$

Charges radiales et axiales admissibles sur l'arbre lent pour une valeur de  $Fh_2 : n_2 \cdot h = 10\ 000$



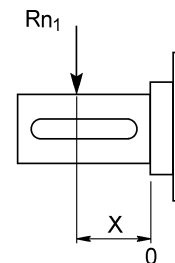
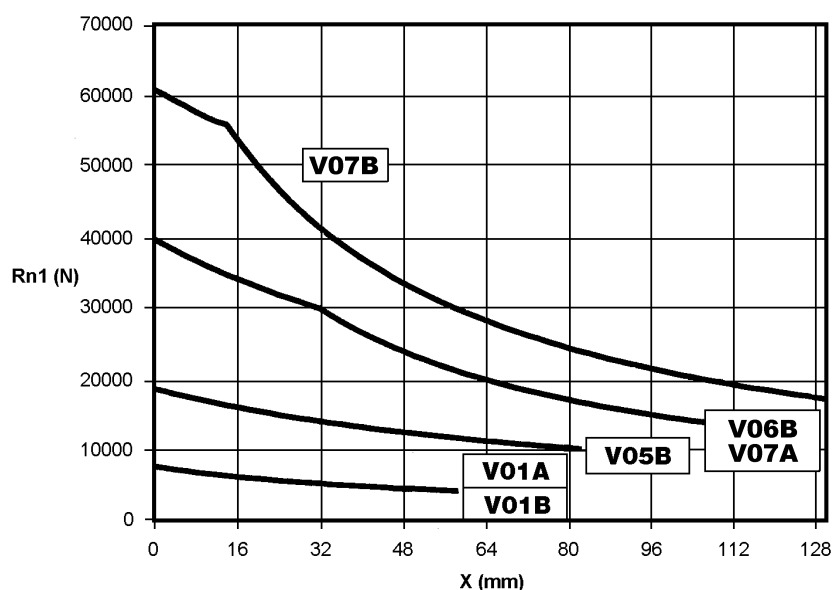
| Fattore $fh_2$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_2$ on shafts<br>Korrektionsfaktor $fh_2$ für wellenbelastungen<br>Facteur de correction $fh_2$ pour charges sur les arbres | $fh_2$ | $Fh_2 = n_2 \cdot h$ | 10 000 | 25 000 | 50 000 | 100 000 | 500 000 | 1 000 000 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------|--------|--------|--------|---------|---------|-----------|
|                                                                                                                                                                                                             |        | FZ                   | 1      | 0.74   | 0.58   | 0.46    | 0.27    | 0.21      |
|                                                                                                                                                                                                             |        | HZ - HC - PC - PZ    | 1      | 0.76   | 0.61   | 0.50    | 0.31    | 0.25      |

Carichi radiali ammissibili sull'albero veloce per un valore di  $Fh_1 : n_1 \cdot h = 250\ 000$

Permissible radial loads on input shaft with  $Fh_1 : n_1 \cdot h = 250\ 000$

An der Antriebswelle zulässige Radiallasten für einen Wert von  $Fh_1 : n_1 \cdot h = 250\ 000$

Charges radiales admises sur l'arbre d'entrée pour une valeur de  $Fh_1 : n_1 \cdot h = 250\ 000$



| Fattore $fh_1$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_1$ on shafts<br>Korrektionsfaktor $fh_1$ für wellenbelastungen<br>Facteur de correction $fh_1$ pour charges sur les arbres | $Fh_1 = n_1 \cdot h$ | 250 000 | 500 000 | 1 000 000 | 2 000 000 | 5 000 000 | 10 000 000 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|---------|-----------|-----------|-----------|------------|
|                                                                                                                                                                                                             | $fh_1$               | 1       | 0.79    | 0.63      | 0.50      | 0.37      | 0.29       |

# 310L

**M<sub>2</sub> = 25000 Nm**

|  | i     | M <sub>n2</sub> [Nm]        |                             |                             |                              |                              |                                | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|-----------------------------------------------------------------------------------|-------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                   | 1:    | n <sub>2</sub> ·h<br>10 000 | n <sub>2</sub> ·h<br>25 000 | n <sub>2</sub> ·h<br>50 000 | n <sub>2</sub> ·h<br>100 000 | n <sub>2</sub> ·h<br>500 000 | n <sub>2</sub> ·h<br>1 000 000 | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>L1</b>                                                                         | 4.09  | 30 000                      | 30 000                      | 26 200                      | 21 300                       | 13 100                       | 10 700                         | 150            | 35             | 1 000                | 1 500                |                |                                                                                     |
|                                                                                   | 5.25  | 29 500                      | 25 400                      | 22 700                      | 20 500                       | 12 700                       | 10 300                         | 150            | 35             | 1 000                | 1 500                |                |                                                                                     |
|                                                                                   | 6.23  | 26 000                      | 21 200                      | 18 100                      | 17 800                       | 12 600                       | 10 200                         | 150            | 35             | 1 000                | 1 500                |                |                                                                                     |
| <b>L2</b>                                                                         | 14.7  | 30 000                      | 29 800                      | 26 200                      | 21 300                       | 13 100                       | 10 700                         | 75             | 22             | 1 500                | 3 000                | 2 100          | 6G                                                                                  |
|                                                                                   | 17.4  | 30 000                      | 30 000                      | 26 200                      | 21 300                       | 13 100                       | 10 700                         | 75             | 22             | 1 500                | 3 000                | 2 100          | 6G                                                                                  |
|                                                                                   | 21.8  | 30 000                      | 30 000                      | 26 200                      | 21 300                       | 13 100                       | 10 700                         | 75             | 22             | 1 500                | 3 000                | 1 500          | 6E                                                                                  |
|                                                                                   | 25.4  | 26 100                      | 25 800                      | 25 800                      | 21 300                       | 13 100                       | 10 700                         | 75             | 22             | 1 500                | 3 000                | 1 500          | 6E                                                                                  |
|                                                                                   | 28.0  | 29 500                      | 25 400                      | 22 700                      | 20 500                       | 12 700                       | 10 300                         | 75             | 22             | 1 500                | 3 000                | 1 500          | 6E                                                                                  |
|                                                                                   | 30.7  | 21 800                      | 21 800                      | 21 800                      | 19 900                       | 12 300                       | 10 000                         | 75             | 22             | 1 500                | 3 000                | 1 100          | 6C                                                                                  |
|                                                                                   | 32.6  | 29 500                      | 25 400                      | 22 700                      | 20 500                       | 12 700                       | 10 300                         | 75             | 22             | 1 500                | 3 000                | 1 100          | 6C                                                                                  |
|                                                                                   | 38.6  | 26 000                      | 21 200                      | 18 100                      | 17 800                       | 12 600                       | 10 200                         | 75             | 22             | 1 500                | 3 000                | 850            | 6B                                                                                  |
|                                                                                   | 46.7  | 26 000                      | 21 200                      | 18 100                      | 17 800                       | 12 600                       | 10 200                         | 71             | 22             | 1 500                | 3 000                | 850            | 6B                                                                                  |
| <b>L3</b>                                                                         | 53.0  | 29 100                      | 29 100                      | 26 200                      | 21 300                       | 13 100                       | 10 700                         | 40             | 18             | 1 800                | 3 800                | 630            | 5E                                                                                  |
|                                                                                   | 62.6  | 30 000                      | 29 800                      | 26 200                      | 21 300                       | 13 100                       | 10 700                         | 40             | 18             | 1 800                | 3 800                | 630            | 5E                                                                                  |
|                                                                                   | 73.9  | 30 000                      | 30 000                      | 26 200                      | 21 300                       | 13 100                       | 10 700                         | 40             | 18             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                   | 80.3  | 29 500                      | 25 400                      | 22 700                      | 20 500                       | 12 700                       | 10 300                         | 40             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 91.3  | 24 900                      | 24 900                      | 21 400                      | 17 400                       | 10 700                       | 8 700                          | 40             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 101   | 29 500                      | 25 400                      | 22 700                      | 20 500                       | 12 700                       | 10 300                         | 40             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 110   | 22 900                      | 22 900                      | 22 500                      | 18 300                       | 11 300                       | 9 200                          | 36             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 119   | 29 500                      | 25 400                      | 22 700                      | 20 500                       | 12 700                       | 10 300                         | 40             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 130   | 27 000                      | 27 000                      | 25 300                      | 20 500                       | 12 700                       | 10 300                         | 36             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 142   | 29 300                      | 25 400                      | 22 700                      | 20 500                       | 12 700                       | 10 300                         | 35             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 164   | 30 000                      | 30 000                      | 26 200                      | 21 300                       | 13 100                       | 10 700                         | 32             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 177   | 26 000                      | 21 200                      | 18 100                      | 17 800                       | 12 600                       | 10 200                         | 26             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 202   | 29 500                      | 25 400                      | 22 700                      | 20 500                       | 12 700                       | 10 300                         | 26             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 230   | 21 800                      | 21 800                      | 21 800                      | 19 900                       | 12 300                       | 10 000                         | 17.3           | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 249   | 26 000                      | 21 200                      | 18 100                      | 17 800                       | 12 600                       | 10 200                         | 20             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 295   | 28 000                      | 25 400                      | 22 700                      | 20 500                       | 12 700                       | 10 300                         | 17.3           | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 350   | 26 000                      | 21 200                      | 18 100                      | 17 800                       | 12 600                       | 10 200                         | 14.7           | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
| <b>L4</b>                                                                         | 389   | 24 900                      | 24 900                      | 21 400                      | 17 400                       | 10 700                       | 8 700                          | 18.9           | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 451   | 30 000                      | 25 700                      | 20 900                      | 16 900                       | 10 500                       | 8 500                          | 19.7           | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 507   | 29 500                      | 25 400                      | 22 700                      | 20 500                       | 12 700                       | 10 300                         | 17.5           | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 556   | 27 000                      | 27 000                      | 25 300                      | 20 500                       | 12 700                       | 10 300                         | 14.4           | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 637   | 22 900                      | 22 900                      | 22 500                      | 18 300                       | 11 300                       | 9 200                          | 10.6           | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 726   | 29 500                      | 25 400                      | 22 700                      | 20 500                       | 12 700                       | 10 300                         | 12.2           | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 818   | 29 300                      | 25 400                      | 22 700                      | 20 500                       | 12 700                       | 10 300                         | 10.6           | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 939   | 27 000                      | 27 000                      | 25 300                      | 20 500                       | 12 700                       | 10 300                         | 8.5            | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 021 | 29 300                      | 25 400                      | 22 700                      | 20 500                       | 12 700                       | 10 300                         | 8.5            | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 164 | 29 500                      | 25 400                      | 22 700                      | 20 500                       | 12 700                       | 10 300                         | 7.6            | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 259 | 28 000                      | 25 400                      | 22 700                      | 20 500                       | 12 700                       | 10 300                         | 7.0            | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 438 | 26 000                      | 21 200                      | 18 100                      | 17 800                       | 12 600                       | 10 200                         | 6.2            | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 657 | 21 800                      | 21 800                      | 21 800                      | 19 900                       | 12 300                       | 10 000                         | 5.4            | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 794 | 26 000                      | 21 200                      | 18 100                      | 17 800                       | 12 600                       | 10 200                         | 4.9            | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 022 | 26 000                      | 21 200                      | 18 100                      | 17 800                       | 12 600                       | 10 200                         | 4.4            | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 523 | 26 000                      | 21 200                      | 18 100                      | 17 800                       | 12 600                       | 10 200                         | 3.5            | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

# M<sub>2</sub> = 25000 Nm

# 310R

|  | i    | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|----------------------------------------------------------------------------------|------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                  | 1:   | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>R2 (A)</b>                                                                    | 17.7 | 14 800               | 14 300            | 14 300            | 14 300            | 9 500             | 7 700             | 130            | 55             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                  | 22.7 | 18 300               | 18 300            | 18 300            | 18 300            | 12 700            | 8 700             | 130            | 55             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                  | 27.0 | 21 800               | 21 200            | 18 700            | 17 800            | 12 600            | 9 100             | 130            | 55             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
| <b>R2 (B)</b>                                                                    | 12.0 | 28 200               | 27 800            | 25 000            | 21 300            | 13 100            | 10 700            | 130            | 55             | 1 500                | 2 500                | 3 200          | 6L                                                                                  |
|                                                                                  | 15.4 | 29 500               | 25 400            | 22 700            | 20 500            | 12 700            | 10 300            | 130            | 55             | 1 500                | 2 500                | 2 600          | 6K                                                                                  |
|                                                                                  | 18.3 | 26 000               | 21 200            | 18 100            | 17 800            | 12 600            | 10 200            | 130            | 55             | 1 500                | 2 500                | 2 100          | 6G                                                                                  |
| <b>R3</b>                                                                        | 37.7 | 14 800               | 12 600            | 10 300            | 8 300             | 5 100             | 4 150             | 35             | 20             | 1 800                | 3 800                | 440            | 4L                                                                                  |
|                                                                                  | 44.6 | 17 100               | 14 200            | 11 500            | 9 400             | 5 800             | 4 700             | 35             | 20             | 1 800                | 3 800                | 440            | 4L                                                                                  |
|                                                                                  | 55.9 | 20 700               | 16 600            | 13 500            | 11 000            | 6 800             | 5 500             | 35             | 20             | 1 800                | 3 800                | 400            | 4K                                                                                  |
|                                                                                  | 65.0 | 23 500               | 18 500            | 15 000            | 12 200            | 7 500             | 6 100             | 35             | 20             | 1 800                | 3 800                | 400            | 4K                                                                                  |
|                                                                                  | 71.8 | 25 500               | 19 800            | 16 100            | 13 100            | 8 100             | 6 500             | 35             | 20             | 1 800                | 3 800                | 400            | 4K                                                                                  |
|                                                                                  | 78.6 | 21 800               | 21 100            | 17 100            | 13 900            | 8 600             | 7 000             | 35             | 20             | 1 800                | 3 800                | 330            | 4H                                                                                  |
|                                                                                  | 83.4 | 28 900               | 22 000            | 17 900            | 14 500            | 9 000             | 7 300             | 35             | 20             | 1 800                | 3 800                | 400            | 4K                                                                                  |
|                                                                                  | 99.0 | 26 000               | 21 200            | 18 100            | 16 400            | 10 100            | 8 200             | 35             | 20             | 1 800                | 3 800                | 330            | 4H                                                                                  |
|                                                                                  | 120  | 26 000               | 21 200            | 18 100            | 17 800            | 11 500            | 9 400             | 35             | 20             | 1 800                | 3 800                | 260            | 4F                                                                                  |
| <b>R4</b>                                                                        | 136  | 29 100               | 29 100            | 24 400            | 19 800            | 12 200            | 9 900             | 35             | 14             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 160  | 30 000               | 29 800            | 26 200            | 21 300            | 13 100            | 10 700            | 35             | 14             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 189  | 30 000               | 30 000            | 26 200            | 21 300            | 13 100            | 10 700            | 35             | 14             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 206  | 29 500               | 25 400            | 22 700            | 20 500            | 12 700            | 10 300            | 35             | 14             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 234  | 24 900               | 24 900            | 21 400            | 17 400            | 10 700            | 8 700             | 32             | 14             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 258  | 29 500               | 25 400            | 22 700            | 20 500            | 12 700            | 10 300            | 34             | 14             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 283  | 22 900               | 22 900            | 22 500            | 18 300            | 11 300            | 9 200             | 24             | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 305  | 29 500               | 25 400            | 22 700            | 20 500            | 12 700            | 10 300            | 29             | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 334  | 27 000               | 27 000            | 25 300            | 20 500            | 12 700            | 10 300            | 24             | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 363  | 29 300               | 25 400            | 22 700            | 20 500            | 12 700            | 10 300            | 24             | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 419  | 30 000               | 30 000            | 26 200            | 21 300            | 13 100            | 10 700            | 21             | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 454  | 26 000               | 21 200            | 18 100            | 17 800            | 12 600            | 10 200            | 19.4           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 517  | 29 500               | 25 400            | 22 700            | 20 500            | 12 700            | 10 300            | 17.2           | 14             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 590  | 21 800               | 21 800            | 21 800            | 19 900            | 12 300            | 10 000            | 12.6           | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 639  | 26 000               | 21 200            | 18 100            | 17 800            | 12 600            | 10 200            | 13.9           | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 757  | 28 000               | 25 400            | 22 700            | 20 500            | 12 700            | 10 300            | 11.7           | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                  | 898  | 26 000               | 21 200            | 18 100            | 17 800            | 12 600            | 10 200            | 9.9            | 14             | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

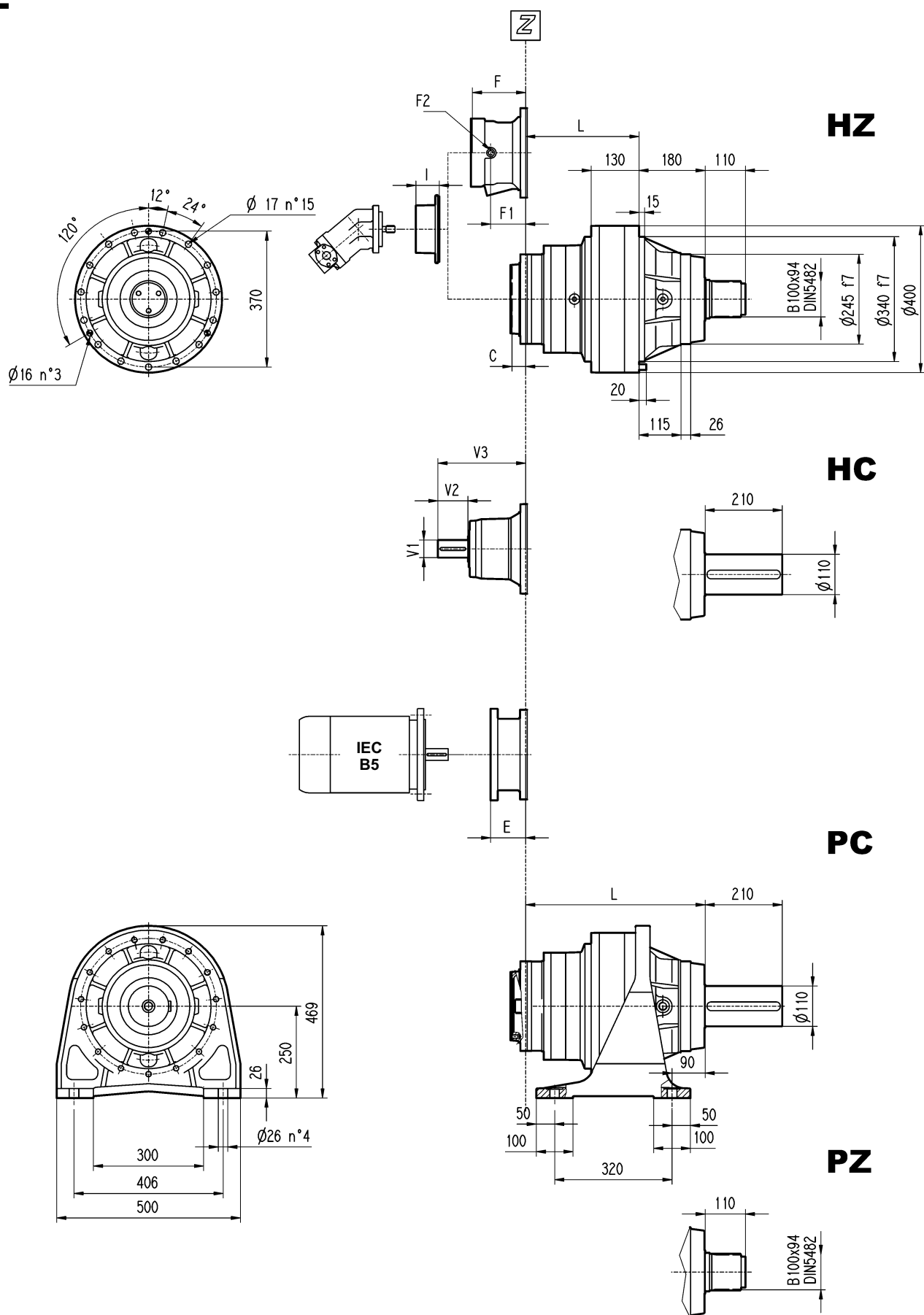
Nota: i contrassegni (A) (B) (C) sulla stessa grandezza, indicano riduzioni angolari di dimensioni differenti: vedere le pagine dimensionali.

Note: Letters (A) (B) (C) near size indication identify different angle reduction dimensions. See pages relevant to dimensions.

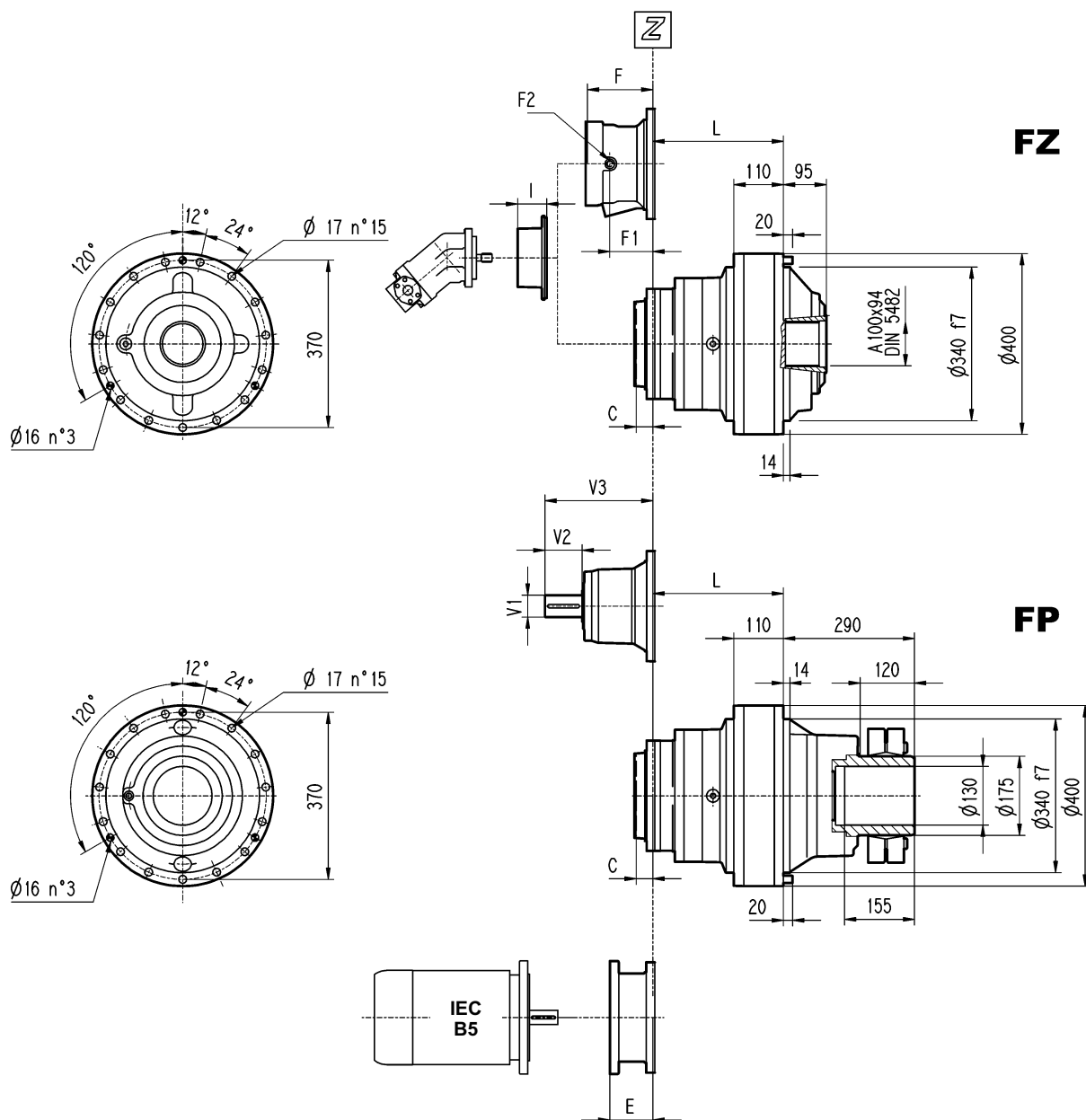
Hinweis: Die Kennzeichnungen (A) (B) (C) an der gleichen Baugröße weisen auf die Winkelreduzierung in unterschiedlichen Maßen hin: siehe Seiten mit Maßtabellen

Remarque : les indications (A) (B) (C) sur la même taille indique des réductions angulaires de dimensions différentes. Se reporter aux pages des dimensions.

# 310L



# 310L

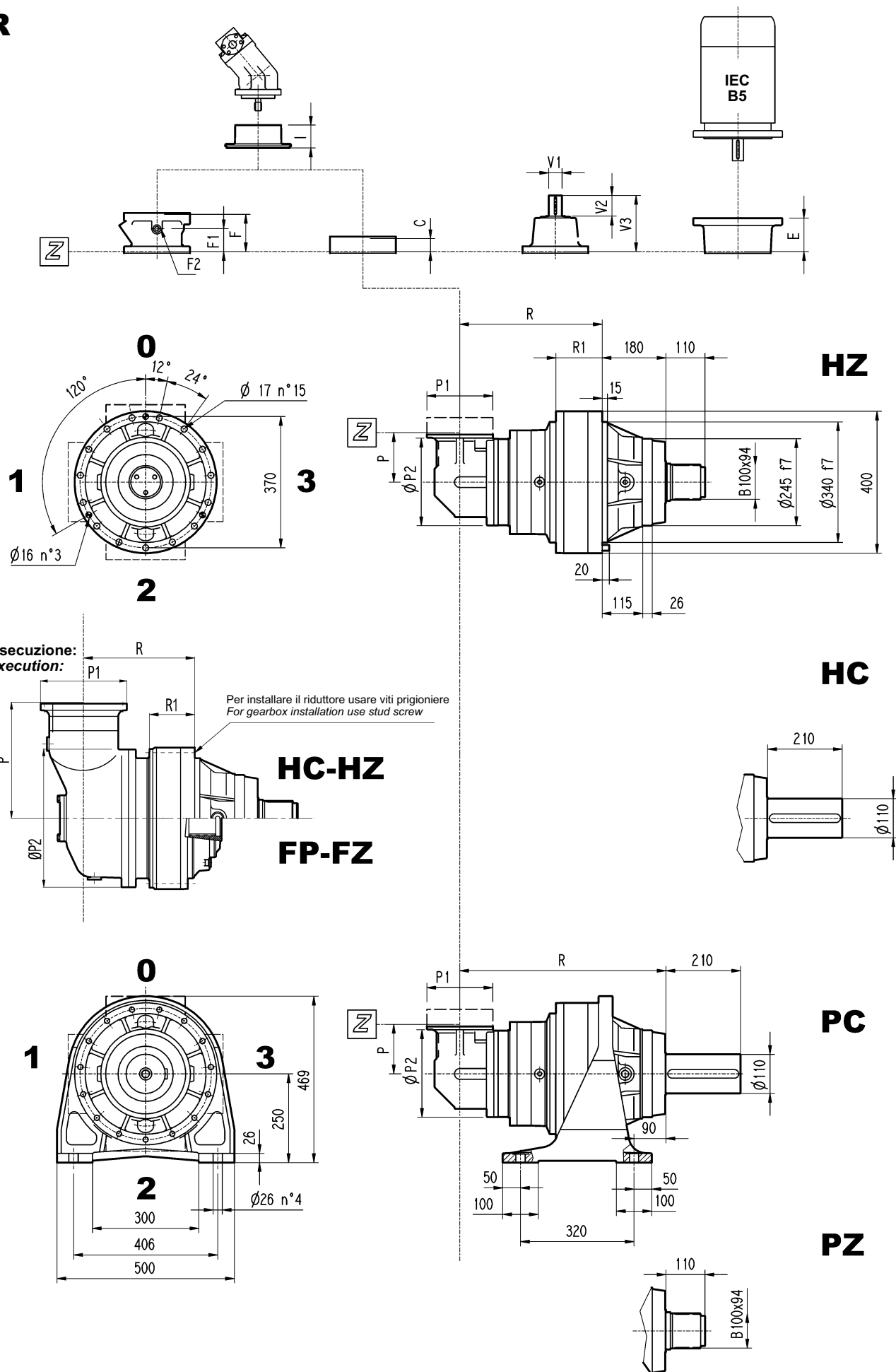


|                                                       |                                                                                                            |           |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | 36 000 Nm |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------|

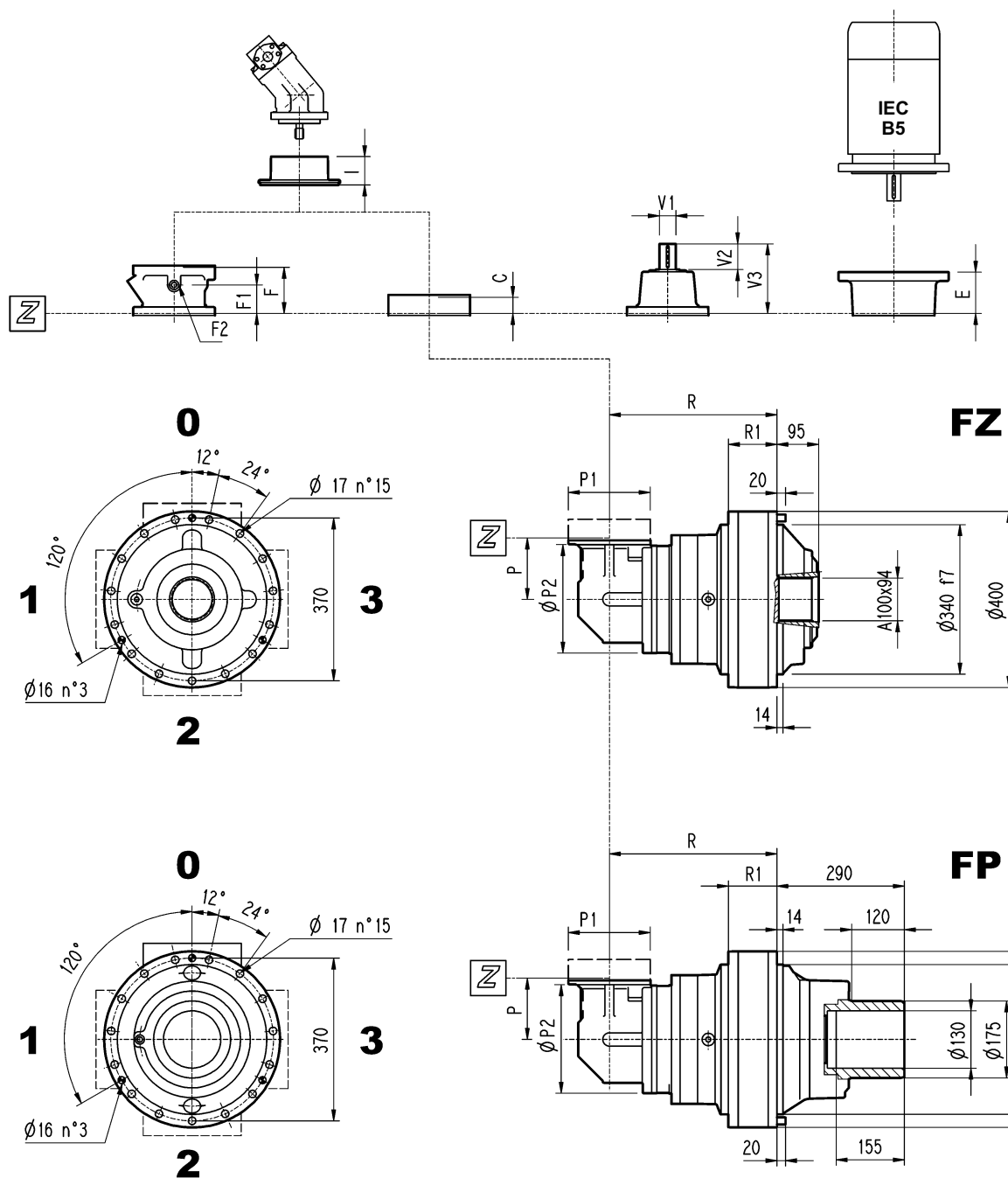
|        | L        |          |     |     |  |          |     |     |  |                                       |  |  |     |       |                             |                                       |                                                                                       |  |
|--------|----------|----------|-----|-----|-------------------------------------------------------------------------------------|----------|-----|-----|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-------|-----------------------------|---------------------------------------|---------------------------------------------------------------------------------------|--|
|        | HZ<br>HC | PC<br>PZ | FZ  | FP  | HZ<br>HC                                                                            | PC<br>PZ | FZ  | FP  | C                                                                                   | Entrata<br>Input<br>Antrieb<br>Entrée | I                                                                                     | F                                                                                     | F1  | F2    | Tipo<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |  |  |
| 310 L1 | 108      | 288      | 88  | 88  | 135                                                                                 | 155      | 110 | 115 | 88                                                                                  | C                                     |  |                                                                                       |     |       |                             |                                       |                                                                                       |  |
| 310 L2 | 244      | 424      | 224 | 224 | 165                                                                                 | 185      | 140 | 145 | 45                                                                                  | B                                     |                                                                                       | 195                                                                                   | 147 | 1/4 G | 6                           | B                                     | 28                                                                                    |  |
| 310 L3 | 309      | 489      | 289 | 289 | 174                                                                                 | 194      | 149 | 154 | 37                                                                                  | A                                     |                                                                                       | 145                                                                                   | 95  | 1/4 G | 5                           | A                                     | 16                                                                                    |  |
| 310 L4 | 362      | 542      | 342 | 342 | 178                                                                                 | 198      | 153 | 158 | 37                                                                                  | A                                     |                                                                                       | 105                                                                                   | 65  | 1/4 G | 4                           | A                                     | 10                                                                                    |  |

|        | V1 | V2  | V3    | Kg | V1 | V2 | V3  | Kg | E         |           |           |            |            |            |            |            |            |            |            |
|--------|----|-----|-------|----|----|----|-----|----|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|
|        |    |     |       |    |    |    |     |    | IEC<br>71 | IEC<br>80 | IEC<br>90 | IEC<br>100 | IEC<br>112 | IEC<br>132 | IEC<br>160 | IEC<br>180 | IEC<br>200 | IEC<br>225 | IEC<br>250 |
| 310 L1 | 80 | 130 | 377   | 50 |    |    |     |    |           |           |           |            |            |            |            |            | 271        | 301        | 281        |
| 310 L2 | 60 | 105 | 307   | 23 |    |    |     |    |           |           |           |            |            |            |            | 152        | 182        | 212        | 193        |
| 310 L3 | 48 | 82  | 239   | 15 |    |    |     |    |           |           |           |            | 114        | 144        | 144        | 174        |            |            |            |
| 310 L4 | 24 | 36  | 137.5 | 6  | 38 | 58 | 158 | 7  | 65        | 84        | 84        | 94         | 94         | 114        | 144        |            |            |            |            |

# 310R



# 310R



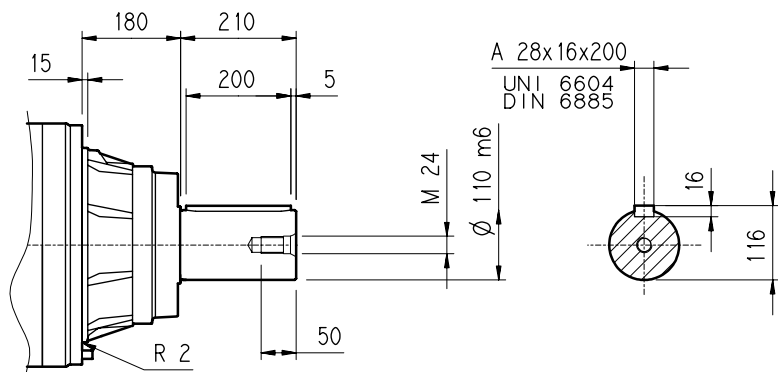
|             |                           |           |
|-------------|---------------------------|-----------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 36 000 Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |           |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |           |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |           |

|            | R        |          |     |     | R1       |          |     |     | P   | P1  | P2  |  |          |     |     |  |                                       |         |  |     |       |    |                             |                                       |
|------------|----------|----------|-----|-----|----------|----------|-----|-----|-----|-----|-----|---------------------------------------------------------------------------------------|----------|-----|-----|---------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-------|----|-----------------------------|---------------------------------------|
|            | HZ<br>HC | PC<br>PZ | FZ  | FP  | HZ<br>HC | PC<br>PZ | FZ  | FP  |     |     |     | HZ<br>HC                                                                              | PC<br>PZ | FZ  | FP  | C                                                                                     | Entrata<br>Input<br>Antrieb<br>Entrée |                                                                                              | I                                                                                     | F   | F1    | F2 | Tipo<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |
| 310 R2 (B) | 315      | 495      | 295 | 295 | 130      | —        | 110 | 110 | 345 | 292 | 400 | 260                                                                                   | 280      | 240 | 250 | 45                                                                                    | B                                     | <br>191 | 195                                                                                   | 147 | 1/4 G | 6  | B                           | 28                                    |
| 310 R2 (A) | 315      | 495      | 295 | 295 | 130      | —        | 110 | 110 | 330 | 245 | 345 | 240                                                                                   | 260      | 220 | 230 | 37                                                                                    | A                                     |                                                                                              | 145                                                                                   | 95  | 1/4 G | 5  | A                           | 16                                    |
| 310 R3     | 381      | 561      | 361 | 361 | 130      | —        | 110 | 110 | 140 | 186 | 244 | 189                                                                                   | 209      | 164 | 169 | 37                                                                                    | A                                     |                                                                                              | 105                                                                                   | 65  | 1/4 G | 4  | A                           | 10                                    |
| 310 R4     | 401      | 581      | 381 | 381 | 130      | —        | 110 | 110 | 140 | 186 | 244 | 194                                                                                   | 214      | 169 | 174 | 37                                                                                    | A                                     |                                                                                              | 105                                                                                   | 65  | 1/4 G | 4  | A                           | 10                                    |

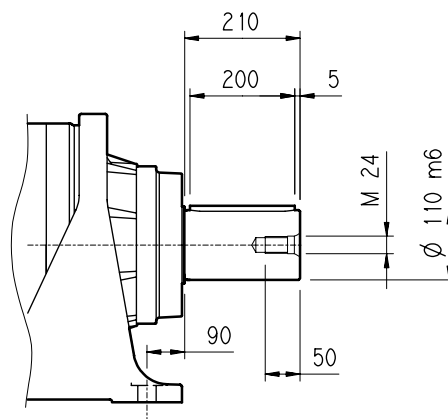
|            | V1 | V2  | V3    | Kg | V1 | V2 | V3  | Kg | E      |        |        |        |         |         |         |         |         |         |         |
|------------|----|-----|-------|----|----|----|-----|----|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
|            |    |     |       |    |    |    |     |    | IEC 63 | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 | IEC 200 | IEC 225 |
| 310 R2 (B) | 60 | 105 | 307   | 23 |    |    |     |    |        |        |        |        |         |         |         |         |         |         |         |
| 310 R2 (A) | 48 | 82  | 239   | 15 |    |    |     |    |        |        |        |        |         |         | 114     | 144     | 144     | 174     | 174     |
| 310 R3     | 24 | 36  | 137.5 | 6  | 38 | 58 | 158 | 7  |        | 65     | 84     | 84     | 94      | 94      | 114     | 144     |         |         |         |
| 310 R4     | 24 | 36  | 137.5 | 6  | 38 | 58 | 158 | 7  |        | 65     | 84     | 84     | 94      | 94      | 114     | 144     |         |         |         |

# 310L - 310R

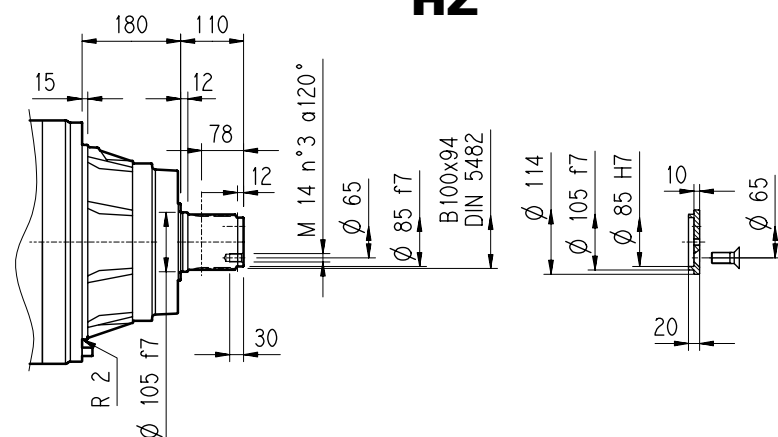
## HC



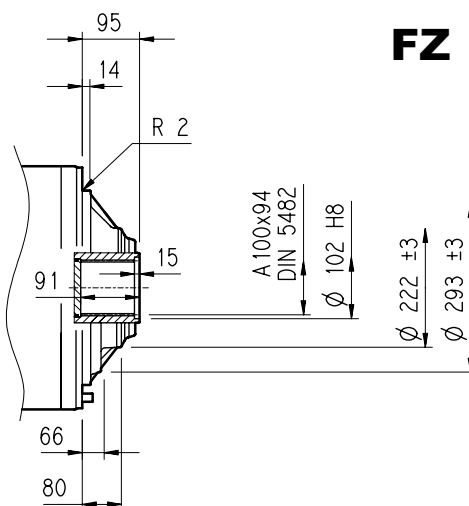
## PC



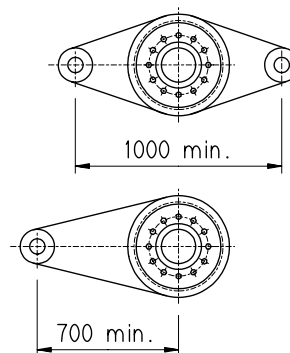
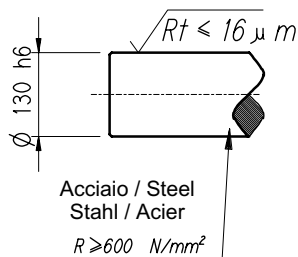
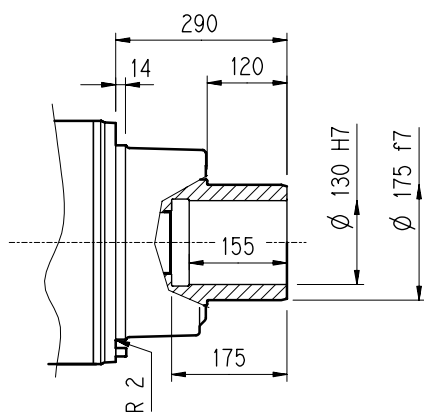
## HZ



## FZ



## FP

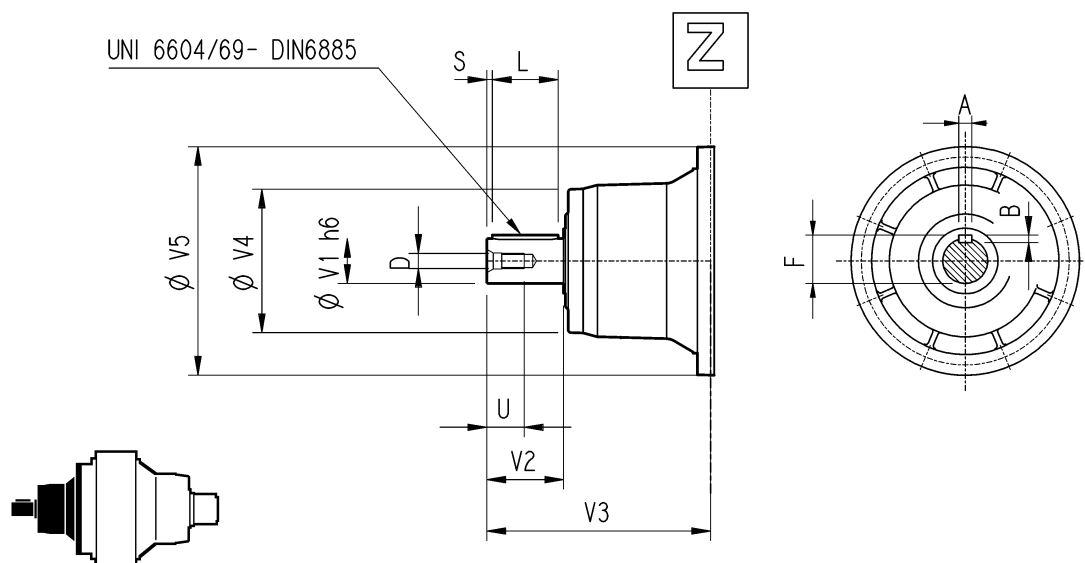


|                                                       |                                                                                                            |           |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRASMISSIBILE | 36 000 Nm |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------|



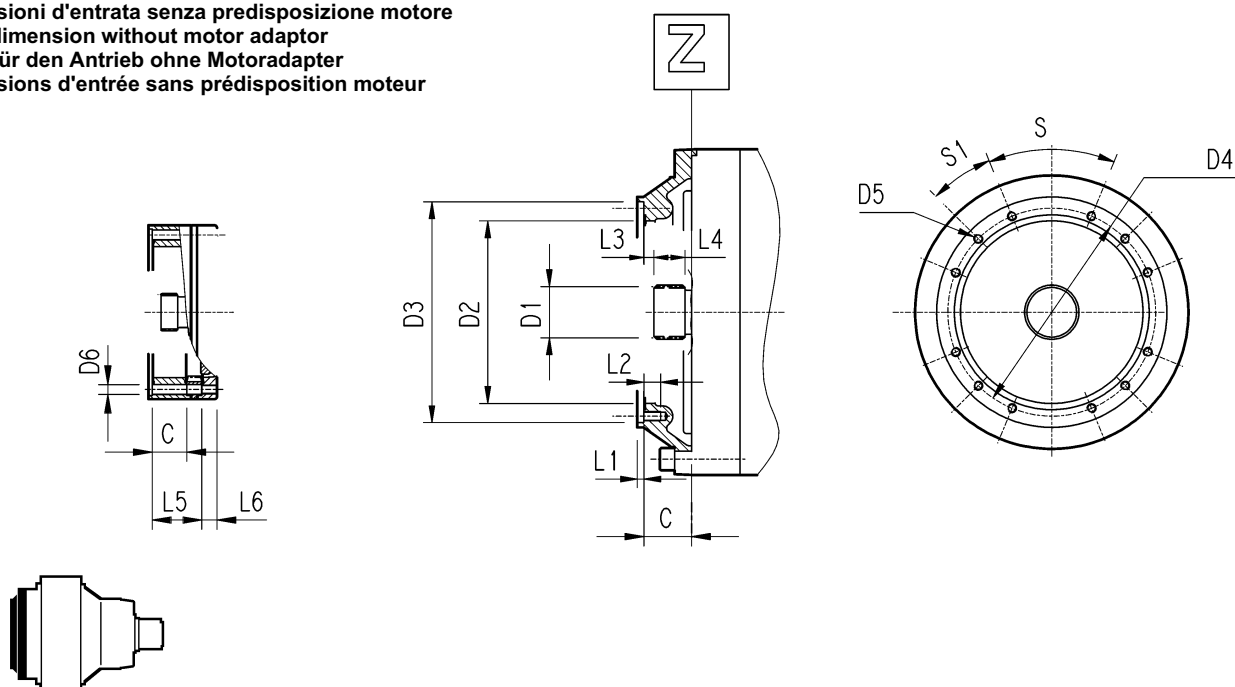
# 310L - 310R

Alberi veloci / Input shaft  
Antriebswellen / Arbres d'entrée



|            | CODE | V1 | V2  | V3    | V4  | V5  | A  | B  | F    | L   | S   | D   | U  |
|------------|------|----|-----|-------|-----|-----|----|----|------|-----|-----|-----|----|
| 310 L1     | V10B | 80 | 130 | 377   | 200 | 400 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
| 310 L2     | V06B | 60 | 105 | 307   | 155 | 292 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |
| 310 L3     | V05B | 48 | 82  | 239   | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 310 L4     | V01A | 24 | 36  | 137.5 | 120 | 186 | 8  | 7  | 27   | 30  | 3   | M8  | 19 |
|            | V01B | 38 | 58  | 158   | 120 | 186 | 10 | 8  | 41   | 50  | 4   | M12 | 28 |
| 310 R2 (B) | V06B | 60 | 105 | 307   | 155 | 292 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |
| 310 R2 (A) | V05B | 48 | 82  | 239   | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 310 R3-R4  | V01A | 24 | 36  | 137.5 | 120 | 186 | 8  | 7  | 27   | 30  | 3   | M8  | 19 |
|            | V01B | 38 | 58  | 158   | 120 | 186 | 10 | 8  | 41   | 50  | 4   | M12 | 28 |

Dimensioni d'entrata senza predisposizione motore  
Input dimension without motor adaptor  
Maße für den Antrieb ohne Motoradapter  
Dimensions d'entrée sans prédisposition moteur



|                  | C  | D1             | D2  | D3     | D4  | D5       | D6 | L1 | L2 | L3 | L4 | L5 | L6 | S   | S1    | Entrata<br>Input<br>Antrieb<br>Entrée |
|------------------|----|----------------|-----|--------|-----|----------|----|----|----|----|----|----|----|-----|-------|---------------------------------------|
| 310 L1           | 88 | 70x64 DIN 5482 | 200 | 282 H7 | 266 | M12 n°12 | /  | 4  | 22 | 11 | 32 | /  | /  | 45° | 45°   | C                                     |
| 310 L2           | 45 | 58x53 DIN 5482 | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11 | 22 | /  | /  | 45° | 22.5° | B                                     |
| 310 L3           | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 0  | 4  | 18 | 9  | 18 | 0  | 0  | 45° | 45°   | A                                     |
| 310 L4           | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | 0  | 9  | 18 | 53 | 18 | 45° | 45°   | A                                     |
| 310 R2 (B)       | 45 | 58x53 DIN 5482 | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11 | 22 | /  | /  | 45° | 22.5° | B                                     |
| 310 R2 (A)-R3-R4 | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | /  | 9  | 18 | 37 | 18 | 45° | 45°   | A                                     |

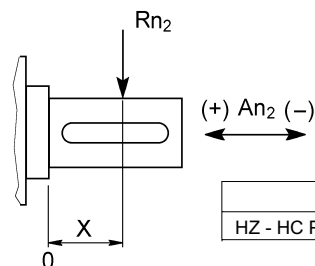
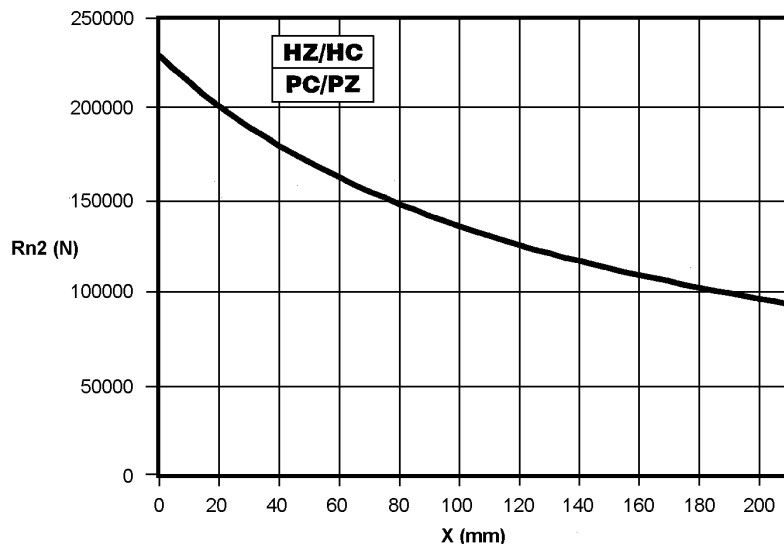
## 310L - 310R

Carichi radiali ed assiali ammissibili sull'albero lento per un valore di  $Fh_2 : n_2 \cdot h = 10\,000$

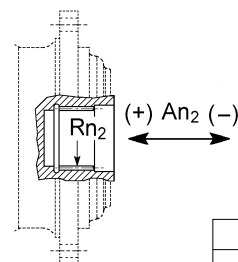
Permissible radial and axial loads on output shaft with  $Fh_2 : n_2 \cdot h = 10\,000$

An der Ausgangswelle zulässige Radiallasten und Axialkräfte für einen Wert von  $Fh_2 : n_2 \cdot h = 10\,000$

Charges radiales et axiales admissibles sur l'arbre lent pour une valeur de  $Fh_2 : n_2 \cdot h = 10\,000$



|                 | $An_2 (+)$ | $An_2 (-)$ |
|-----------------|------------|------------|
| HZ - HC PC - PZ | 170 000    | 100 000    |



|    | $Rn_2$ | $An_2 (+/-)$ |
|----|--------|--------------|
| FZ | 65 000 | 52 000       |

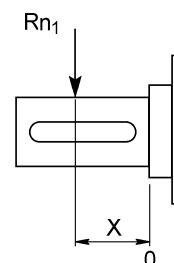
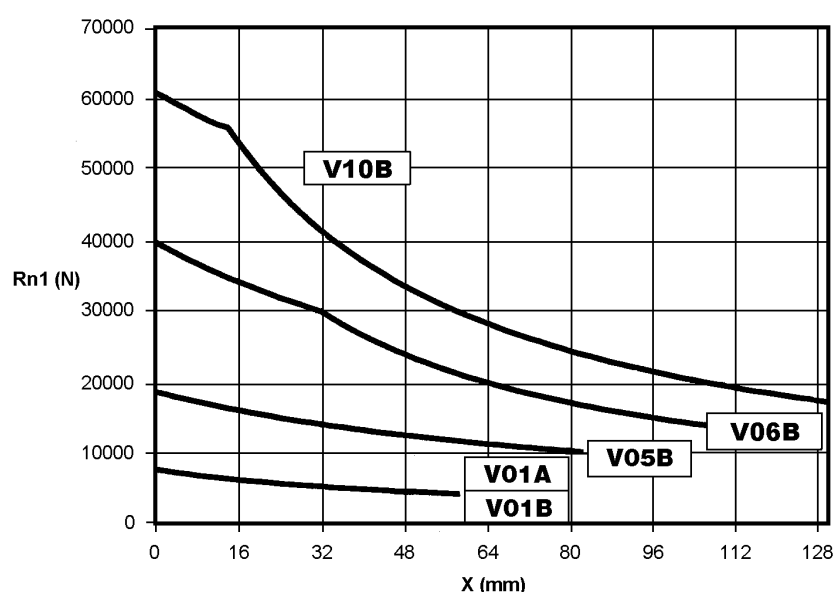
| Fattore $fh_2$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_2$ on shafts<br>Korrektionsfaktor $fh_2$ für wellenbelastungen<br>Facteur de correction $fh_2$ pour charges sur les arbres | $fh_2$ | $Fh_2 = n_2 \cdot h$ | 10 000 | 25 000 | 50 000 | 100 000 | 500 000 | 1 000 000 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------|--------|--------|--------|---------|---------|-----------|
|                                                                                                                                                                                                             |        | FZ                   | 1      | 0.74   | 0.58   | 0.46    | 0.27    | 0.21      |
|                                                                                                                                                                                                             |        | HZ - HC - PC - PZ    | 1      | 0.76   | 0.61   | 0.50    | 0.31    | 0.25      |

Carichi radiali ammissibili sull'albero veloce per un valore di  $Fh_1 : n_1 \cdot h = 250\,000$

Permissible radial loads on input shaft with  $Fh_1 : n_1 \cdot h = 250\,000$

An der Antriebswelle zulässige Radiallasten für einen Wert von  $Fh_1 : n_1 \cdot h = 250\,000$

Charges radiales admises sur l'arbre d'entrée pour une valeur de  $Fh_1 : n_1 \cdot h = 250\,000$



| Fattore $fh_1$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_1$ on shafts<br>Korrektionsfaktor $fh_1$ für wellenbelastungen<br>Facteur de correction $fh_1$ pour charges sur les arbres | $Fh_1 = n_1 \cdot h$ | 250 000 | 500 000 | 1 000 000 | 2 000 000 | 5 000 000 | 10 000 000 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|---------|-----------|-----------|-----------|------------|
|                                                                                                                                                                                                             | $fh_1$               | 1       | 0.79    | 0.63      | 0.50      | 0.37      | 0.29       |

# 311L

**M<sub>2</sub> = 35000 Nm**

|  | i     | M <sub>n2</sub> [Nm]        |                             |                             |                              |                              |                                | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|-----------------------------------------------------------------------------------|-------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                   | 1:    | n <sub>2</sub> ·h<br>10 000 | n <sub>2</sub> ·h<br>25 000 | n <sub>2</sub> ·h<br>50 000 | n <sub>2</sub> ·h<br>100 000 | n <sub>2</sub> ·h<br>500 000 | n <sub>2</sub> ·h<br>1 000 000 | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>L1</b>                                                                         | 4.09  | 45 000                      | 45 000                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 180            | 35             | 750                  | 1 000                |                |                                                                                     |
|                                                                                   | 5.25  | 43 000                      | 36 500                      | 32 300                      | 32 000                       | 19 700                       | 16 000                         | 180            | 35             | 750                  | 1 000                |                |                                                                                     |
|                                                                                   | 6.23  | 34 000                      | 29 500                      | 27 000                      | 27 000                       | 18 600                       | 15 100                         | 180            | 35             | 750                  | 1 000                |                |                                                                                     |
| <b>L2</b>                                                                         | 14.0  | 35 700                      | 35 700                      | 35 700                      | 30 300                       | 18 700                       | 15 200                         | 100            | 25             | 1 500                | 2 500                | 3 200          | 6L                                                                                  |
|                                                                                   | 16.7  | 45 000                      | 45 000                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 100            | 25             | 1 500                | 2 500                | 3 200          | 6L                                                                                  |
|                                                                                   | 18.0  | 43 000                      | 36 500                      | 32 300                      | 32 000                       | 19 700                       | 16 000                         | 100            | 25             | 1 500                | 2 500                | 2 600          | 6K                                                                                  |
|                                                                                   | 21.5  | 44 100                      | 41 700                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 100            | 25             | 1 500                | 2 500                | 2 100          | 6G                                                                                  |
|                                                                                   | 25.5  | 35 200                      | 34 500                      | 34 500                      | 30 300                       | 18 700                       | 15 200                         | 100            | 25             | 1 500                | 2 500                | 1 500          | 6E                                                                                  |
|                                                                                   | 27.6  | 43 000                      | 36 500                      | 32 300                      | 32 000                       | 19 700                       | 16 000                         | 100            | 25             | 1 500                | 2 500                | 2 100          | 6G                                                                                  |
|                                                                                   | 32.7  | 43 000                      | 36 500                      | 32 300                      | 32 000                       | 19 700                       | 16 000                         | 100            | 25             | 1 500                | 2 500                | 1 500          | 6E                                                                                  |
|                                                                                   | 38.8  | 34 000                      | 29 500                      | 27 000                      | 27 000                       | 18 600                       | 15 100                         | 100            | 25             | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                   |       |                             |                             |                             |                              |                              |                                |                |                |                      |                      |                |                                                                                     |
| <b>L3</b>                                                                         | 50.5  | 35 700                      | 35 700                      | 35 700                      | 30 300                       | 18 700                       | 15 200                         | 60             | 18             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                   | 60.2  | 45 000                      | 45 000                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 60             | 18             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                   | 71.1  | 45 000                      | 45 000                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 60             | 18             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                   | 77.3  | 44 100                      | 41 700                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 60             | 18             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                   | 87.0  | 35 700                      | 35 700                      | 35 700                      | 30 300                       | 18 700                       | 15 200                         | 60             | 18             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                   | 104   | 45 000                      | 45 000                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 60             | 18             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                   | 115   | 44 100                      | 41 700                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 60             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 126   | 45 000                      | 45 000                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 60             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 133   | 44 100                      | 41 700                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 56             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 147   | 43 000                      | 36 500                      | 32 300                      | 32 000                       | 19 700                       | 16 000                         | 50             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 161   | 44 100                      | 41 700                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 48             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 171   | 43 000                      | 36 500                      | 32 300                      | 32 000                       | 19 700                       | 16 000                         | 44             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 191   | 35 200                      | 34 500                      | 34 500                      | 30 300                       | 18 700                       | 15 200                         | 33             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 203   | 43 000                      | 36 500                      | 32 300                      | 32 000                       | 19 700                       | 16 000                         | 38             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 245   | 43 000                      | 36 500                      | 32 300                      | 32 000                       | 19 700                       | 16 000                         | 32             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 291   | 34 000                      | 29 500                      | 27 000                      | 27 000                       | 18 600                       | 15 100                         | 22             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
| <b>L4</b>                                                                         | 348   | 45 000                      | 45 000                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 30             | 11             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 410   | 45 000                      | 45 000                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 30             | 11             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 512   | 45 000                      | 45 000                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 26             | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 568   | 44 100                      | 41 700                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 23             | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 626   | 35 700                      | 35 700                      | 35 700                      | 30 300                       | 18 700                       | 15 200                         | 16.9           | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 724   | 45 000                      | 45 000                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 18.4           | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 825   | 44 100                      | 41 700                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 16.1           | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 904   | 45 000                      | 45 000                      | 37 400                      | 30 300                       | 18 700                       | 15 200                         | 14.7           | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 986   | 43 000                      | 36 500                      | 32 300                      | 32 000                       | 19 700                       | 16 000                         | 13.5           | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 103 | 35 200                      | 34 500                      | 34 500                      | 30 300                       | 18 700                       | 15 200                         | 11.8           | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 230 | 43 000                      | 36 500                      | 32 300                      | 32 000                       | 19 700                       | 16 000                         | 10.8           | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 415 | 43 000                      | 36 500                      | 32 300                      | 32 000                       | 19 700                       | 16 000                         | 9.4            | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 680 | 34 000                      | 29 500                      | 27 000                      | 27 000                       | 18 600                       | 15 100                         | 7.9            | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 766 | 43 000                      | 36 500                      | 32 300                      | 32 000                       | 19 700                       | 16 000                         | 7.5            | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 096 | 34 000                      | 29 500                      | 27 000                      | 27 000                       | 18 600                       | 15 100                         | 6.3            | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

# M<sub>2</sub> = 35000 Nm

# 311R

|  | i    | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|----------------------------------------------------------------------------------|------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                  | 1:   | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>R2 (A)</b>                                                                    | 17.7 | 14 800               | 14 300            | 14 300            | 14 300            | 9 600             | 7 800             | 135            | 75             | 1 800                | 3 800                | 1000           | 5K                                                                                  |
|                                                                                  | 22.7 | 18 300               | 18 300            | 18 300            | 18 300            | 11 500            | 9 300             | 135            | 75             | 1 800                | 3 800                | 1000           | 5K                                                                                  |
|                                                                                  | 27.0 | 21 800               | 21 800            | 21 800            | 21 000            | 12 900            | 10 500            | 135            | 75             | 1 800                | 3 800                | 1000           | 5K                                                                                  |
| <b>R2 (B)</b>                                                                    | 12.0 | 28 200               | 27 800            | 25 000            | 23 800            | 15 900            | 12 700            | 150            | 75             | 1 500                | 2 500                | 3200           | 6L                                                                                  |
|                                                                                  | 15.4 | 35 600               | 33 600            | 31 100            | 30 600            | 18 800            | 15 300            | 150            | 75             | 1 500                | 2 500                | 3200           | 6L                                                                                  |
|                                                                                  | 18.3 | 34 000               | 29 500            | 27 000            | 27 000            | 18 600            | 15 100            | 150            | 75             | 1 500                | 2 500                | 2600           | 6K                                                                                  |
| <b>R2 (C)</b>                                                                    | 16.6 | 39 300               | 29 800            | 23 800            | 19 400            | 11 900            | 9 800             | 150            | 90             | 1 500                | 2 500                | 3200           | 6L                                                                                  |
|                                                                                  | 21.3 | 43 000               | 34 600            | 28 300            | 22 900            | 14 300            | 11 500            | 150            | 90             | 1 500                | 2 500                | 2600           | 6K                                                                                  |
|                                                                                  | 25.3 | 34 000               | 29 500            | 27 000            | 26 000            | 16 000            | 13 000            | 150            | 90             | 1 500                | 2 500                | 2100           | 6G                                                                                  |
| <b>R3</b>                                                                        | 53.0 | 31 100               | 26 800            | 24 000            | 22 100            | 13 700            | 11 100            | 85             | 40             | 2 000                | 4 000                | 800            | 5G                                                                                  |
|                                                                                  | 63.2 | 36 000               | 31 100            | 28 000            | 25 000            | 15 500            | 12 600            | 85             | 40             | 2 000                | 4 000                | 800            | 5G                                                                                  |
|                                                                                  | 68.0 | 38 300               | 33 100            | 30 100            | 26 400            | 16 300            | 13 200            | 85             | 40             | 2 000                | 4 000                | 630            | 5E                                                                                  |
|                                                                                  | 81.1 | 44 100               | 38 400            | 36 000            | 29 800            | 18 400            | 14 900            | 85             | 40             | 2 000                | 4 000                | 630            | 5E                                                                                  |
|                                                                                  | 96.3 | 35 200               | 34 500            | 34 500            | 30 300            | 18 700            | 15 200            | 62             | 40             | 2 000                | 4 000                | 500            | 5C                                                                                  |
|                                                                                  | 104  | 43 000               | 36 500            | 32 300            | 32 000            | 19 700            | 16 000            | 67             | 40             | 2 000                | 4 000                | 500            | 5C                                                                                  |
|                                                                                  | 124  | 43 000               | 36 500            | 32 300            | 32 000            | 19 700            | 16 000            | 58             | 40             | 2 000                | 4 000                | 400            | 5B                                                                                  |
|                                                                                  | 147  | 34 000               | 29 500            | 27 000            | 27 000            | 18 600            | 15 100            | 40             | 40             | 2 000                | 4 000                | 400            | 5B                                                                                  |
| <b>R4</b>                                                                        | 154  | 43 200               | 32 800            | 26 700            | 21 700            | 13 400            | 10 900            | 35             | 22             | 2 000                | 4 000                | 330            | 4H                                                                                  |
|                                                                                  | 182  | 45 000               | 36 900            | 29 900            | 24 300            | 15 000            | 12 200            | 35             | 22             | 2 000                | 4 000                | 330            | 4H                                                                                  |
|                                                                                  | 198  | 44 100               | 39 100            | 31 700            | 25 800            | 15 900            | 12 900            | 35             | 22             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 223  | 35 700               | 35 700            | 34 500            | 28 000            | 17 300            | 14 000            | 35             | 22             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 266  | 45 000               | 45 000            | 37 300            | 30 300            | 18 700            | 15 200            | 35             | 22             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 294  | 44 100               | 41 700            | 37 300            | 30 300            | 18 700            | 15 200            | 35             | 22             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 322  | 45 000               | 45 000            | 37 300            | 30 300            | 18 700            | 15 200            | 35             | 22             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 341  | 44 100               | 41 700            | 37 300            | 30 300            | 18 700            | 15 200            | 35             | 22             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 413  | 44 100               | 41 700            | 37 300            | 30 300            | 18 700            | 15 200            | 32             | 22             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 438  | 43 000               | 36 500            | 32 300            | 32 000            | 19 700            | 16 000            | 30             | 22             | 2 000                | 4 000                | 100            | 4D                                                                                  |
|                                                                                  | 490  | 35 200               | 34 500            | 34 500            | 30 300            | 18 700            | 15 200            | 24             | 22             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 520  | 43 000               | 36 500            | 32 300            | 32 000            | 19 700            | 16 000            | 24             | 22             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 629  | 43 000               | 36 500            | 32 300            | 32 000            | 19 700            | 16 000            | 21             | 22             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 746  | 34 000               | 29 500            | 27 000            | 27 000            | 18 600            | 15 100            | 16             | 22             | 2 000                | 4 000                | 100            | 4B                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

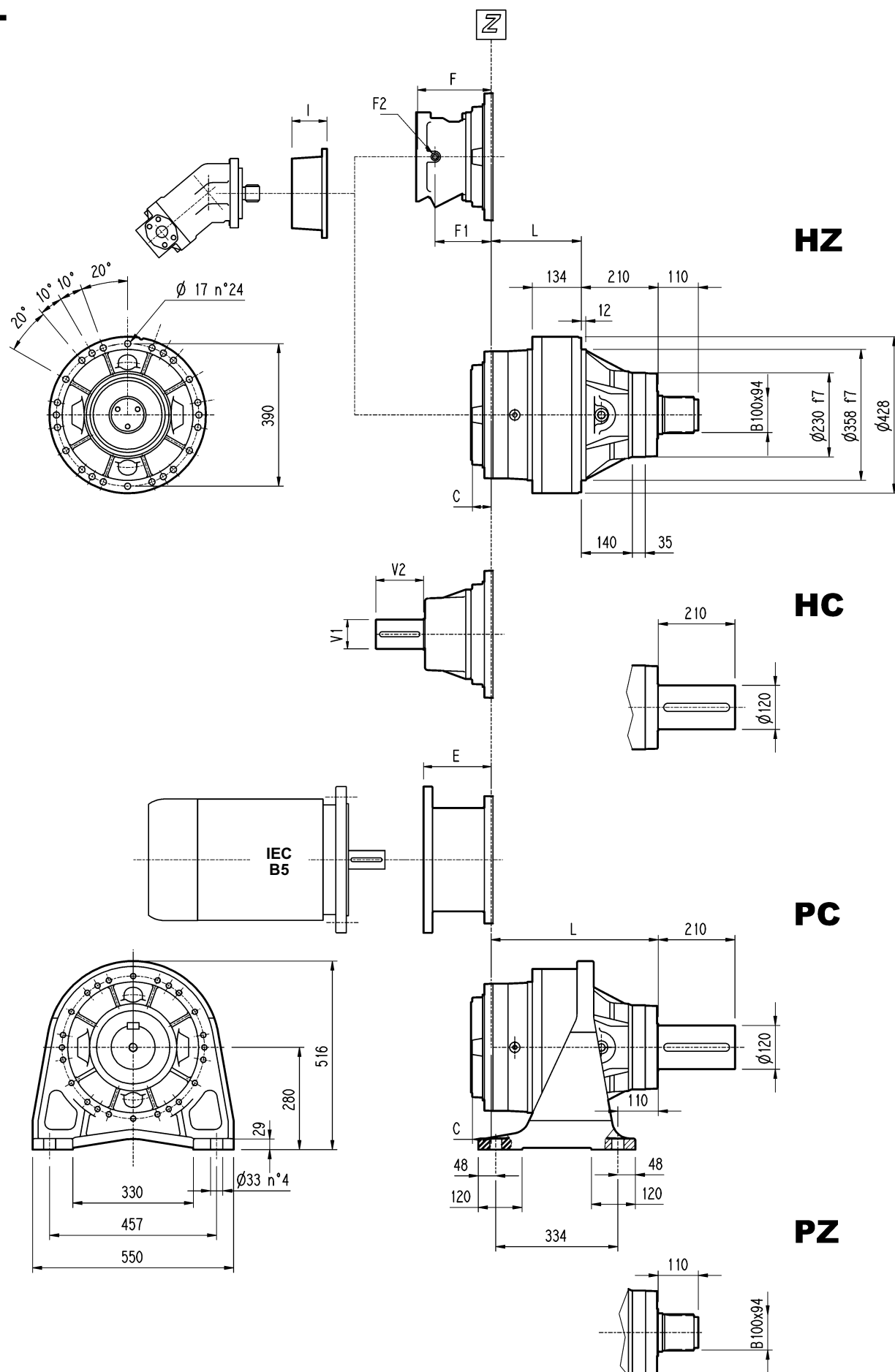
Nota: i contrassegni (A) (B) (C) sulla stessa grandezza, indicano riduzioni angolari di dimensioni differenti: vedere le pagine dimensionali.

Note: Letters (A) (B) (C) near size indication identify different angle reduction dimensions. See pages relevant to dimensions.

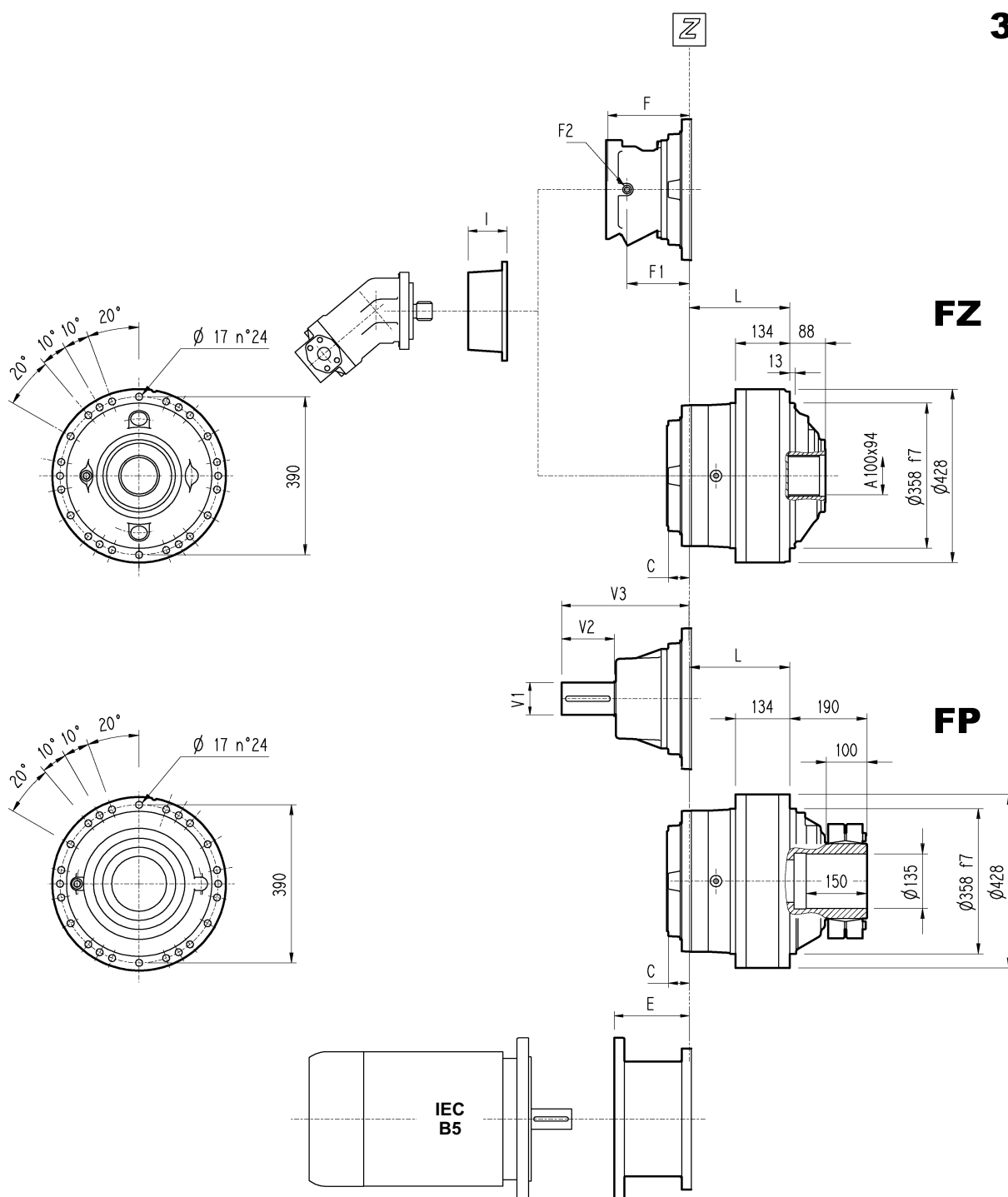
Hinweis: Die Kennzeichnungen (A) (B) (C) an der gleichen Baugröße weisen auf die Winkelreduzierung in unterschiedlichen Maßen hin: siehe Seiten mit Maßtabellen

Remarque : les indications (A) (B) (C) sur la même taille indique des réductions angulaires de dimensions différentes. Se reporter aux pages des dimensions.

# 311L



# 311L

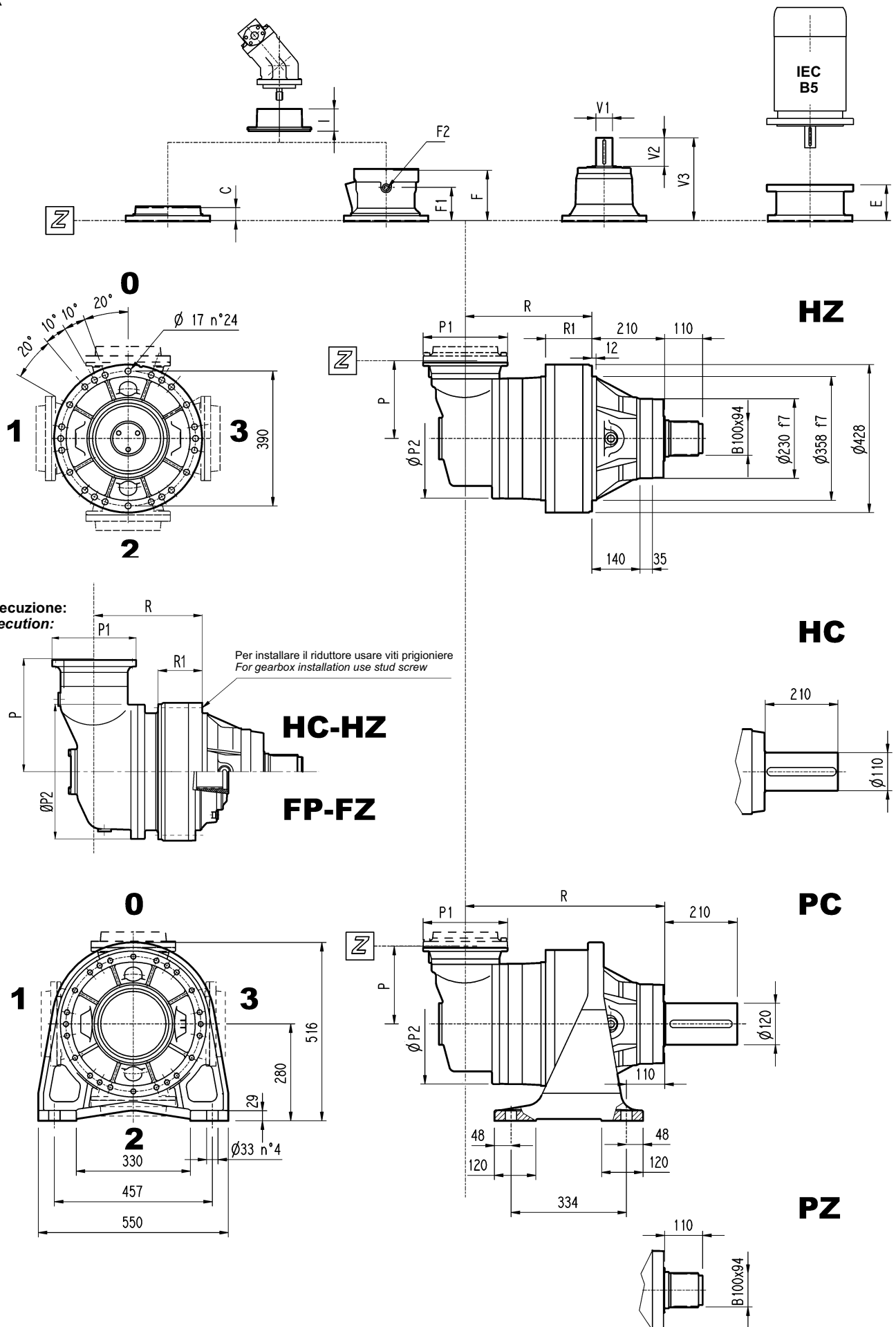


|                                                       |                                                                                                            |           |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | 54 000 Nm |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------|

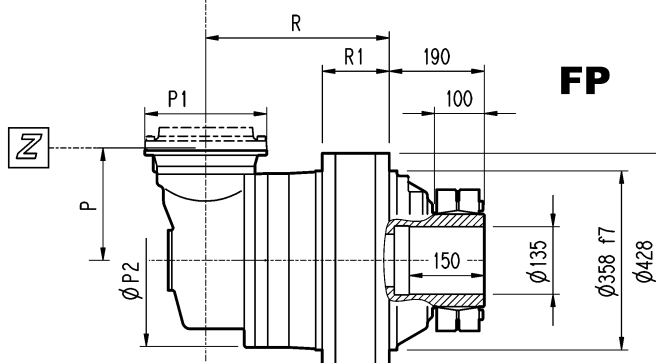
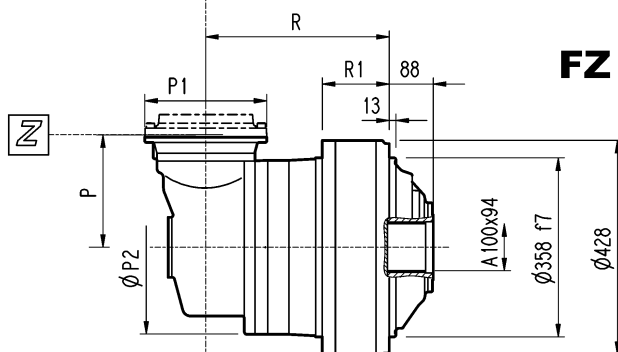
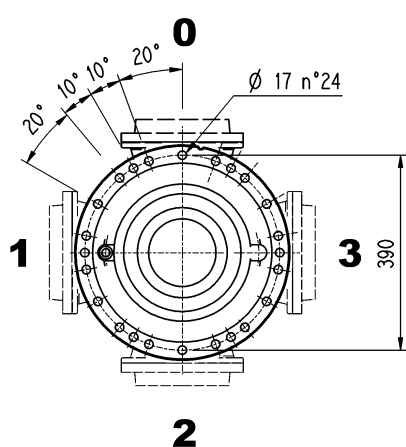
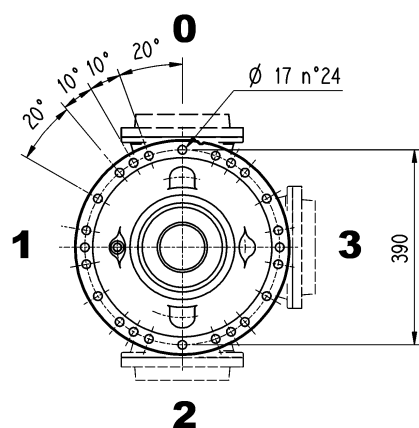
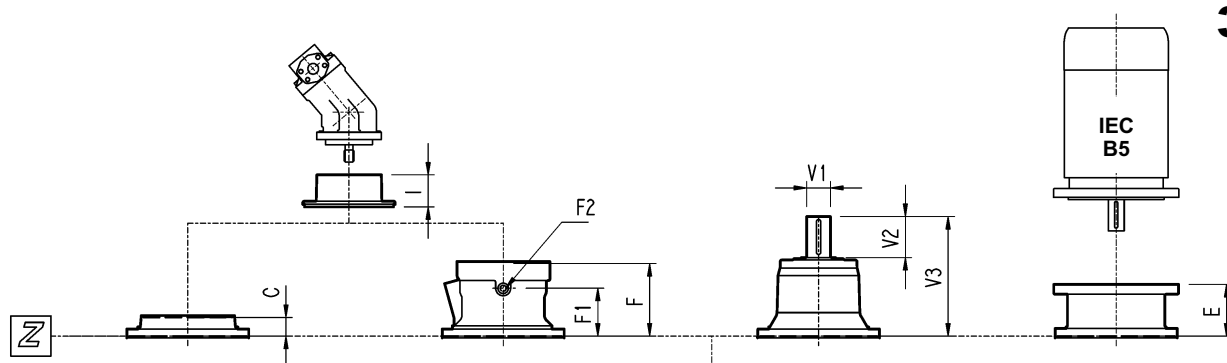
|        | L        |          |     |     | Kg       |          |     |     |    |                                       |     |     |     |       |                     |                                       | Kg |
|--------|----------|----------|-----|-----|----------|----------|-----|-----|----|---------------------------------------|-----|-----|-----|-------|---------------------|---------------------------------------|----|
|        | HZ<br>HC | PC<br>PZ | FZ  | FP  | HZ<br>HC | PC<br>PZ | FZ  | FP  | C  | Entrata<br>Input<br>Antrieb<br>Entrée | I   | F   | F1  | F2    | Tipo<br>Type<br>Typ | Entrata<br>Input<br>Antrieb<br>Entrée |    |
| 311 L1 | 115      | 325      | 115 | 115 | 180      | 250      | 160 | 170 | 81 | D                                     | 191 | 201 | 153 | 1/4 G | 6                   | B                                     | 28 |
| 311 L2 | 248      | 458      | 248 | 248 | 225      | 295      | 205 | 215 | 51 | B                                     |     | 145 | 95  | 1/4 G | 5                   | A                                     | 16 |
| 311 L3 | 337      | 547      | 337 | 337 | 237      | 307      | 217 | 227 | 37 | A                                     |     | 105 | 65  | 1/4 G | 4                   | A                                     | 10 |
| 311 L4 | 402      | 612      | 402 | 402 | 244      | 314      | 224 | 234 | 37 | A                                     |     |     |     |       |                     |                                       |    |

|        | V1 | V2  | V3    |  | V1 | V2  | V3  |  | E |        |        |        |         |         |         |         |         |         |         |         |
|--------|----|-----|-------|-------------------------------------------------------------------------------------|----|-----|-----|---------------------------------------------------------------------------------------|---|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
|        |    |     |       |                                                                                     |    |     |     |                                                                                       |   | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 | IEC 200 | IEC 225 | IEC 250 |
| 311 L1 | 80 | 130 | 348   | 55                                                                                  |    |     |     |                                                                                       |   |        |        |        |         |         |         |         |         |         |         |         |
| 311 L2 | 80 | 130 | 315   | 35                                                                                  | 60 | 105 | 313 | 28                                                                                    |   |        |        |        |         |         |         | 195     | 186     | 216     | 215     |         |
| 311 L3 | 48 | 82  | 239   | 15                                                                                  |    |     |     |                                                                                       |   |        |        |        |         | 114     | 144     | 144     | 174     |         |         |         |
| 311 L4 | 24 | 36  | 137.5 | 6                                                                                   | 38 | 58  | 158 | 7                                                                                     |   | 65     | 84     | 84     | 94      | 94      | 114     | 144     |         |         |         |         |

# 311R



# 311R



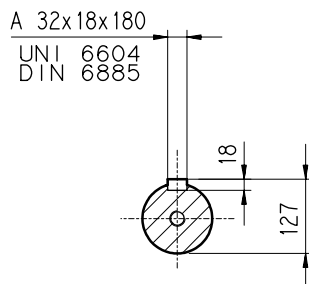
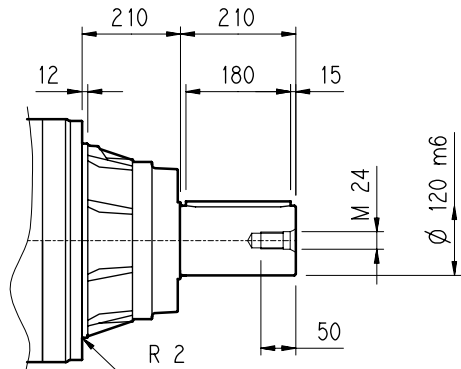
|             |                           |           |
|-------------|---------------------------|-----------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 54 000 Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |           |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |           |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |           |

|            | R        |          |     |     | R1       |          |     |     | P   | P1  | P2  |  |          |     |     |  |                                       |  |  |  |       |                            |                                        |                                                                                       |  |
|------------|----------|----------|-----|-----|----------|----------|-----|-----|-----|-----|-----|-------------------------------------------------------------------------------------|----------|-----|-----|---------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------|----------------------------|----------------------------------------|---------------------------------------------------------------------------------------|--|
|            | HZ<br>HC | PC<br>PZ | FZ  | FP  | HZ<br>HC | PC<br>PZ | FZ  | FP  |     |     |     | HZ<br>HC                                                                            | PC<br>PZ | FZ  | FP  | C                                                                                     | Entrata<br>Input<br>Antrieb<br>Entrée | I                                                                                     | F                                                                                     | F1                                                                                    | F2    | Tip<br>Type<br>Typ<br>Type | Entrat<br>a Input<br>Antrieb<br>Entrée |  |  |
| 311 R2 (B) | 340      | 550      | 340 | 340 | 154      | -        | 154 | 154 | 345 | 292 | 400 | 310                                                                                 | 380      | 290 | 300 | 45                                                                                    | B                                     |  | 195                                                                                   | 147                                                                                   | 1/4 G | 6                          | B                                      | 28                                                                                    |  |
| 311 R2 (C) | 340      | 550      | 340 | 340 | 154      | -        | 154 | 154 | 390 | 292 | 480 | 320                                                                                 | 390      | 300 | 310 | 45                                                                                    | B                                     |                                                                                       | 195                                                                                   | 147                                                                                   | 1/4 G | 6                          | B                                      | 28                                                                                    |  |
| 311 R2 (A) | 340      | 550      | 340 | 340 | 154      | -        | 154 | 154 | 330 | 245 | 390 | 290                                                                                 | 360      | 270 | 280 | 37                                                                                    | A                                     |                                                                                       | 145                                                                                   | 95                                                                                    | 1/4 G | 5                          | A                                      | 16                                                                                    |  |
| 311 R3     | 367      | 577      | 367 | 367 | 134      | -        | 134 | 134 | 225 | 245 | 375 | 275                                                                                 | 345      | 255 | 265 | 37                                                                                    | A                                     |                                                                                       | 145                                                                                   | 95                                                                                    | 1/4 G | 5                          | A                                      | 16                                                                                    |  |
| 311 R4     | 429      | 639      | 429 | 429 | 134      | -        | 134 | 134 | 140 | 186 | 244 | 257                                                                                 | 327      | 237 | 247 | 37                                                                                    | A                                     | 191                                                                                   | 105                                                                                   | 65                                                                                    | 1/4 G | 4                          | A                                      | 10                                                                                    |  |

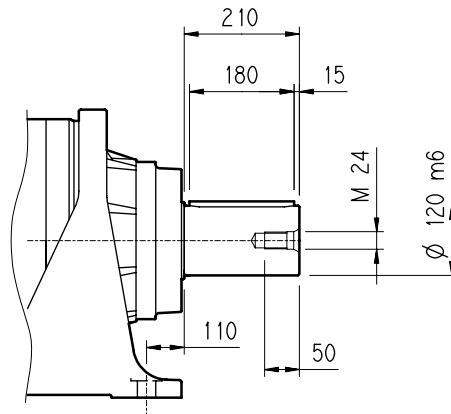
|            | V1 | V2  | V3    |  | V1 | V2 | V3  |  | E      |        |        |         |         |         |         |         |         |         |         |
|------------|----|-----|-------|-------------------------------------------------------------------------------------|----|----|-----|-------------------------------------------------------------------------------------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
|            |    |     |       |                                                                                     |    |    |     |                                                                                     | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 | IEC 200 | IEC 225 | IEC 250 |
| 311 R2 (B) | 60 | 105 | 307   | 23                                                                                  |    |    |     |                                                                                     |        |        |        |         |         |         |         | 152     | 182     | 212     | 193     |
| 311 R2 (C) | 60 | 105 | 307   | 23                                                                                  |    |    |     |                                                                                     |        |        |        |         |         |         |         | 152     | 182     | 212     | 193     |
| 311 R2 (A) | 48 | 82  | 239   | 15                                                                                  |    |    |     |                                                                                     |        |        |        |         | 114     | 144     | 144     | 174     |         |         |         |
| 311 R3     | 48 | 82  | 239   | 15                                                                                  |    |    |     |                                                                                     |        |        |        |         | 114     | 144     | 144     | 174     |         |         |         |
| 311 R4     | 24 | 36  | 137.5 | 6                                                                                   | 38 | 58 | 158 | 7                                                                                   | 65     | 84     | 84     | 94      | 94      | 114     | 144     |         |         |         |         |

# 311L - 311R

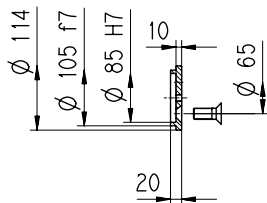
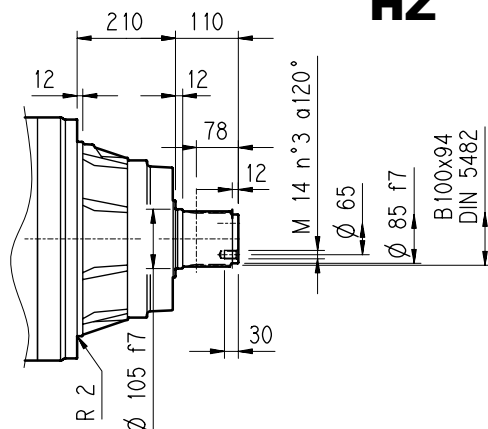
## HC



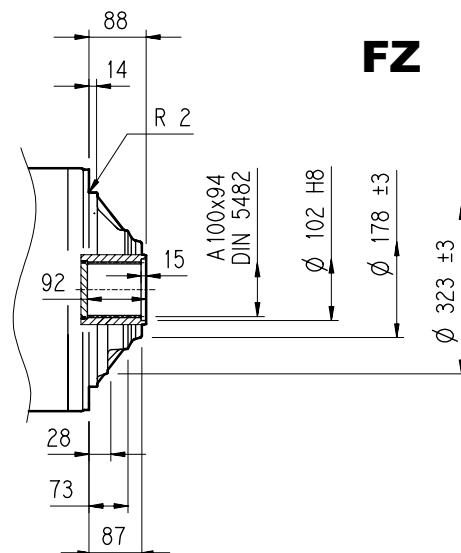
## PC



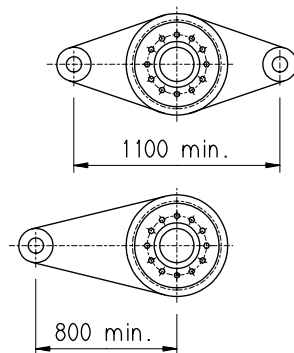
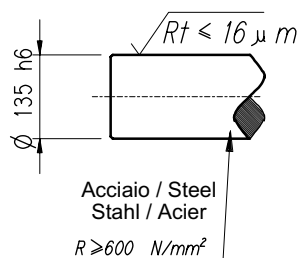
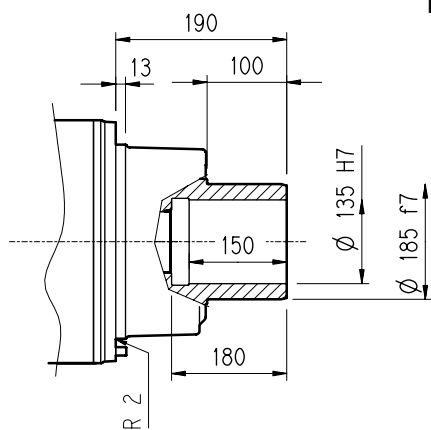
## HZ



## FZ



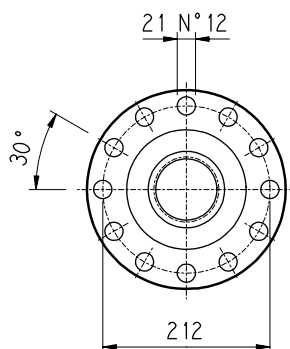
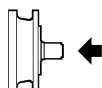
## FP



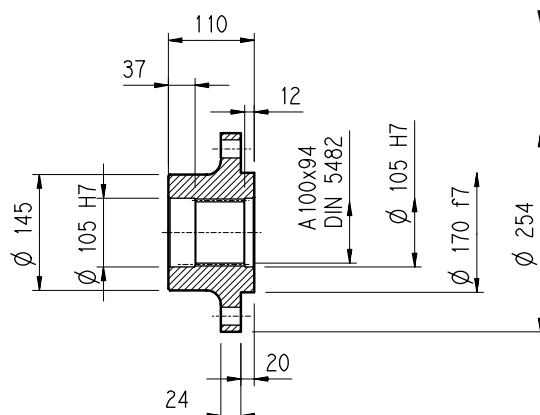
|                                                       |                                                                                                            |           |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | 54 000 Nm |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------|

**Flangia / Flange**  
**Flansch / Brides**

**311L - 311R**

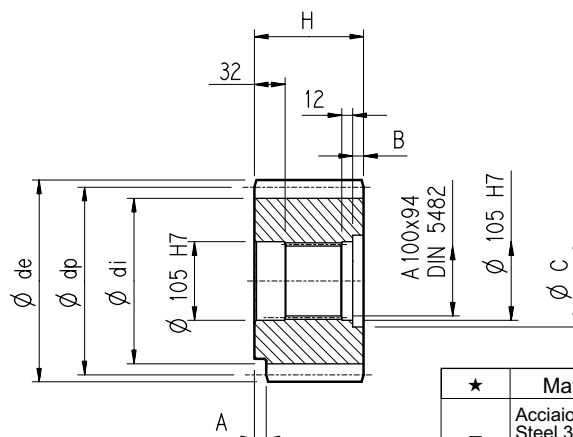
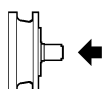


Materiale : Acciaio C40  
Material : Steel C40  
Material : Stahl C40  
Màterial : Acier C40



**W0A**

**Pignoni per rotazione / Output pinions**  
**Ritzel / Pignons**

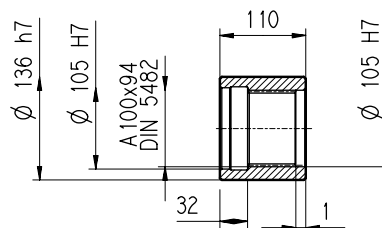
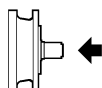


**P...**

|            | m  | z  | x     | dp  | di  | de    | H   | A | B  | C   | ★ |
|------------|----|----|-------|-----|-----|-------|-----|---|----|-----|---|
| <b>PLQ</b> | 12 | 23 | 0     | 276 | 246 | 300   | 110 | 0 | 0  | 0   | □ |
| <b>PPD</b> | 16 | 13 | 0.500 | 208 | 184 | 252.5 | 145 | 0 | 35 | 116 | ■ |
| <b>PPF</b> | 16 | 15 | 0.450 | 240 | 215 | 280   | 125 | 0 | 15 | 120 | □ |

| ★ | Materiale/Material/Material/Material                                                                                                                   |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| ■ | Acciaio 39NiCrMo3 Bonificato<br>Steel 39NiCrMo3 hardened and tempered<br>Vergüteter Stahl 39NiCrMo3<br>Acier bonifié 39NiCrMo3                         |
| □ | Acciaio 18NiCrMo5 Cementato e temprato<br>Steel 18NiCrMo5 Case hardened<br>Einsatzstahl 18NiCrMo5 Einsatzgehärtet<br>Acier cémenté et trempé 18NiCrMo5 |

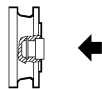
**Manicotti lisci / Sleeve couplings**  
**Naben / Manchons lisses a cannelure interieure**



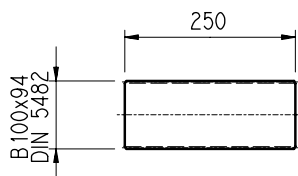
**M0A**

Materiale : Acciaio 16CrNi4  
Material : Steel 16CrNi4  
Material : Stahl 16CrNi4  
Màterial : Acier 16CrNi4

**Barre scanalate / Splined bars**  
**Vielkeilwellen / Barre cannelée**

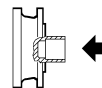


**B0A**

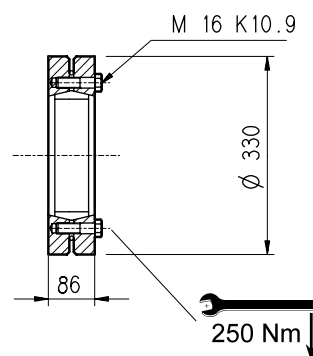


Mat. acciaio 18NiCrMo5 UNI 5331 da cementare e temprare 50-55 HRC  
Case hardening steel 18NiCrMo5 UNI 5331  
must be case hardened 50-55 HRC  
Material: Einsatzstahl 18NiCrMo5 UNI 5331  
muss einsatzgehärtet werden 50-55 HRC  
Acier 18 NiCrMo5 UNI 5331 doit être cémenté trempé 50-55 HRC

**Giunto ad attrito / Shrink disc**  
**Schrumpfscheibe / Frette de serrage**

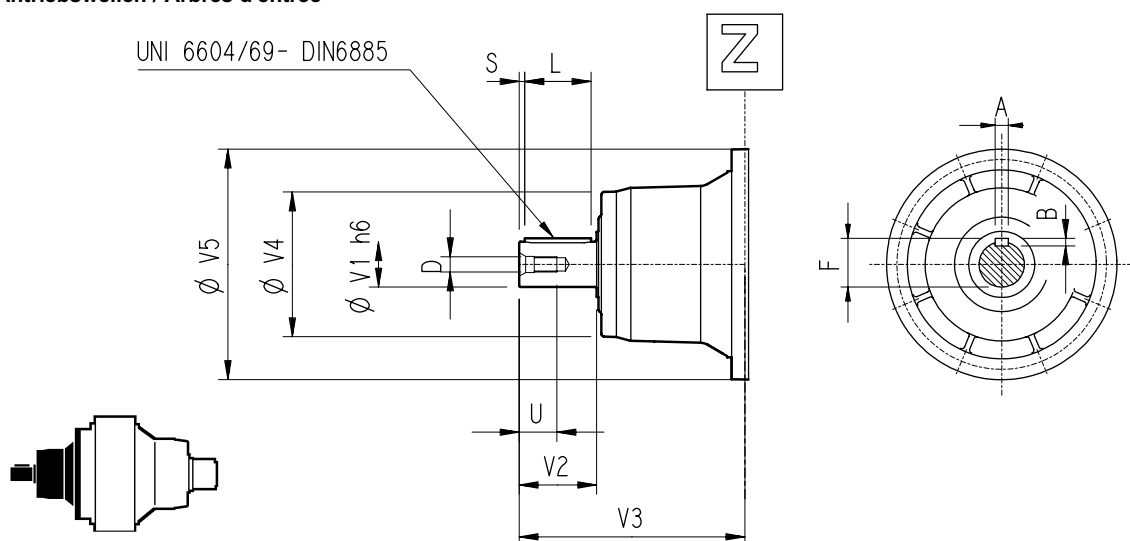


**G0A**



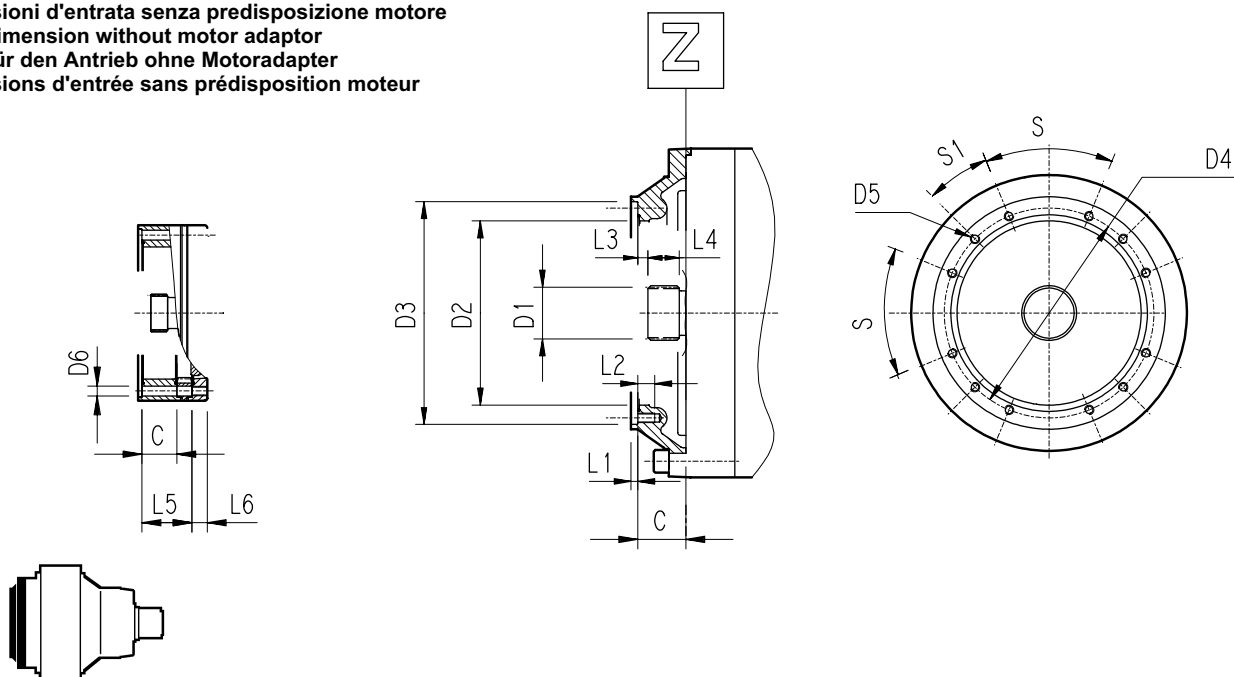
# 311L - 311R

Alberi veloci / Input shaft  
Antriebswellen / Arbres d'entrée



|                | CODE | V1 | V2  | V3    | V4  | V5  | A  | B  | F    | L   | S   | D   | U  |
|----------------|------|----|-----|-------|-----|-----|----|----|------|-----|-----|-----|----|
| 311 L1         | V11B | 80 | 130 | 348   | 200 | 428 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
| 311 L2         | V07B | 80 | 130 | 315   | 200 | 345 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
|                | V07A | 60 | 105 | 313   | 155 | 345 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |
| 311 L3         | V05B | 48 | 82  | 239   | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 311 L4         | V01A | 24 | 36  | 137.5 | 120 | 186 | 8  | 7  | 27   | 30  | 3   | M8  | 19 |
|                | V01B | 38 | 58  | 158   | 120 | 186 | 10 | 8  | 41   | 50  | 4   | M12 | 28 |
| 311 R2 (A)-R3  | V05B | 48 | 82  | 239   | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 311 R2 (B) (C) | V06B | 60 | 105 | 307   | 155 | 292 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |
| 311 R4         | V01A | 24 | 36  | 137.5 | 120 | 186 | 8  | 7  | 27   | 30  | 3   | M8  | 19 |
|                | V01B | 38 | 58  | 158   | 120 | 186 | 10 | 8  | 41   | 50  | 4   | M12 | 28 |

Dimensioni d'entrata senza predisposizione motore  
Input dimension without motor adaptor  
Maße für den Antrieb ohne Motoradapter  
Dimensions d'entrée sans prédisposition moteur



|                | C  | D1             | D2  | D3     | D4  | D5       | D6 | L1 | L2 | L3  | L4 | L5 | L6 | S   | S1    | Entrata<br>Input<br>Antrieb<br>Entrée |
|----------------|----|----------------|-----|--------|-----|----------|----|----|----|-----|----|----|----|-----|-------|---------------------------------------|
| 311 L1         | 81 | 80x74 DIN 5482 | 270 | 335 H7 | 314 | M16 n°8  | /  | 5  | 30 | 8.5 | 40 | /  | /  | 60° | 30°   | D                                     |
| 311 L2         | 51 | 58x53 DIN 5482 | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11  | 22 | /  | /  | 45° | 22.5° | B                                     |
| 311 L3         | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 0  | 4  | 18 | 9   | 18 | 0  | 0  | 45° | 45°   | A                                     |
| 311 L4         | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | 0  | 9   | 18 | 65 | 18 | 45° | 45°   | A                                     |
| 311 R2 (A)-R3  | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | 18 | 9   | 18 | 0  | 0  | 45° | 45°   | A                                     |
| 311 R2 (B) (C) | 45 | 58x53 DIN 5482 | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11  | 22 | /  | /  | 45° | 22.5° | B                                     |
| 311 R4         | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | /  | 9   | 18 | 37 | 18 | 45° | 45°   | A                                     |

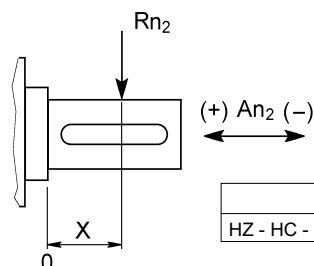
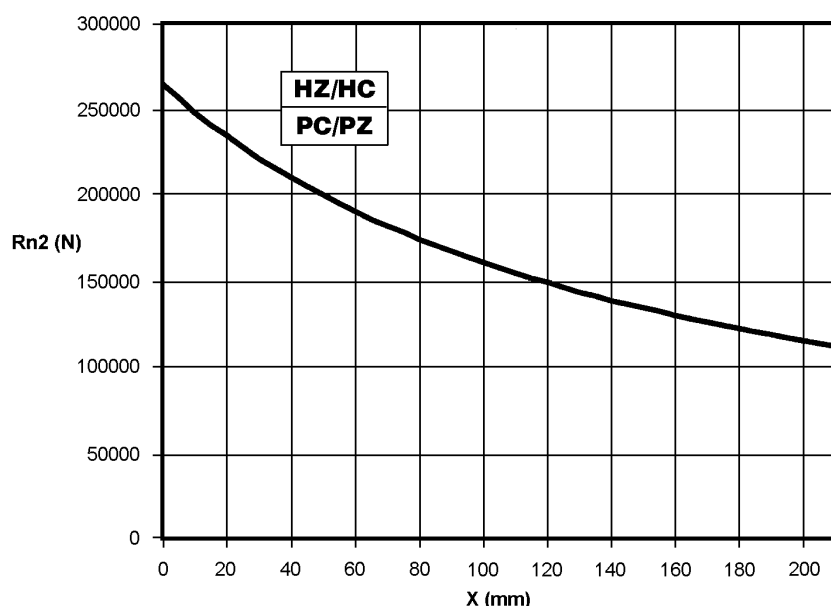
## 311L - 311R

Carichi radiali ed assiali ammissibili sull'albero lento per un valore di  $Fh_2 : n_2 \cdot h = 10\ 000$

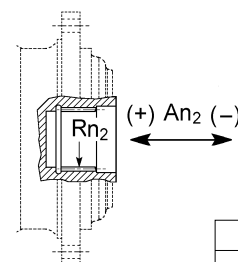
Permissible radial and axial loads on output shaft with  $Fh_2 : n_2 \cdot h = 10\ 000$

An der Ausgangswelle zulässige Radiallasten und Axialkräfte für einen Wert von  $Fh_2 : n_2 \cdot h = 10\ 000$

Charges radiales et axiales admissibles sur l'arbre lent pour une valeur de  $Fh_2 : n_2 \cdot h = 10\ 000$



|                   | An <sub>2</sub> (+) | An <sub>2</sub> (-) |
|-------------------|---------------------|---------------------|
| HZ - HC - PC - PZ | 200 000             | 140 000             |



|    | Rn <sub>2</sub> | An <sub>2</sub> (+/-) |
|----|-----------------|-----------------------|
| FZ | 65 000          | 60 000                |

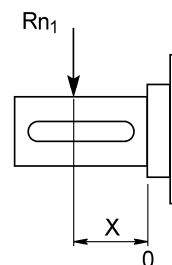
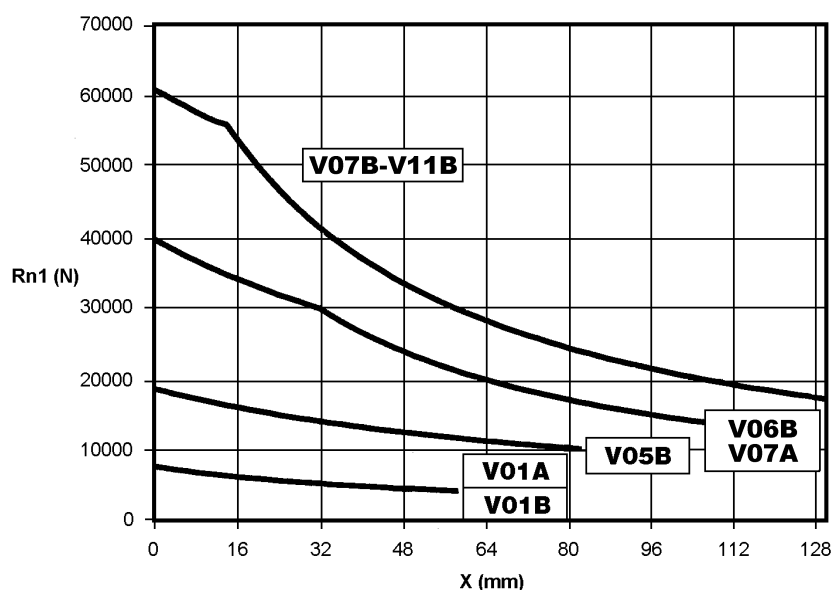
|                                                                                                                                                                                                                                                |                                      |                   |        |        |        |         |         |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------|--------|--------|--------|---------|---------|-----------|
| Fattore fh <sub>2</sub> correttivo per carichi sugli alberi<br>Load corrective factor fh <sub>2</sub> on shafts<br>Korrektionsfaktor fh <sub>2</sub> für wellenbelastungen<br>Facteur de corretion fh <sub>2</sub> pour charges sur les arbres | Fh <sub>2</sub> = n <sub>2</sub> · h |                   | 10 000 | 25 000 | 50 000 | 100 000 | 500 000 | 1 000 000 |
|                                                                                                                                                                                                                                                | fh <sub>2</sub>                      | FZ                | 1      | 0.74   | 0.58   | 0.46    | 0.27    | 0.21      |
|                                                                                                                                                                                                                                                |                                      | HZ - HC - PC - PZ | 1      | 0.76   | 0.61   | 0.50    | 0.31    | 0.25      |

Carichi radiali ammissibili sull'albero veloce per un valore di  $Fh_1 : n_1 \cdot h = 250\ 000$

Permissible radial loads on input shaft with  $Fh_1 : n_1 \cdot h = 250\ 000$

An der Antriebswelle zulässige Radiallasten für einen Wert von  $Fh_1 : n_1 \cdot h = 250\ 000$

Charges radiales admises sur l'arbre d'entrée pour une valeur de  $Fh_1 : n_1 \cdot h = 250\ 000$



| Fattore $fh_1$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_1$ on shafts<br>Korrektionsfaktor $fh_1$ für wellenbelastungen<br>Facteur de correction $fh_1$ pour charges sur les arbres | $Fh_1 = n_1 \cdot h$ |  | 250 000 | 500 000 | 1 000 000 | 2 000 000 | 5 000 000 | 10 000 000 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--|---------|---------|-----------|-----------|-----------|------------|
|                                                                                                                                                                                                             | $fh_1$               |  | 1       | 0.79    | 0.63      | 0.50      | 0.37      | 0.29       |

# 313L

**M<sub>2</sub> = 50000 Nm**

|  | i     | M <sub>n2</sub> [Nm]        |                             |                             |                              |                              |                                | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|-----------------------------------------------------------------------------------|-------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                   | 1:    | n <sub>2</sub> ·h<br>10 000 | n <sub>2</sub> ·h<br>25 000 | n <sub>2</sub> ·h<br>50 000 | n <sub>2</sub> ·h<br>100 000 | n <sub>2</sub> ·h<br>500 000 | n <sub>2</sub> ·h<br>1 000 000 | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>L1</b>                                                                         | 4.14  | 55 000                      | 55 000                      | 55 000                      | 46 000                       | 28 400                       | 23 000                         | 200            | 45             | 500                  | 800                  |                |                                                                                     |
|                                                                                   | 5.40  | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 200            | 45             | 500                  | 800                  |                |                                                                                     |
|                                                                                   | 6.50  | 49 000                      | 42 400                      | 39 000                      | 39 000                       | 27 800                       | 22 500                         | 200            | 45             | 500                  | 800                  |                |                                                                                     |
| <b>L2</b>                                                                         | 14.2  | 52 000                      | 52 000                      | 52 000                      | 46 000                       | 28 400                       | 23 000                         | 130            | 30             | 1 500                | 2 000                | 3 200          | 6L                                                                                  |
|                                                                                   | 16.9  | 55 000                      | 55 000                      | 54 000                      | 44 200                       | 27 300                       | 22 100                         | 130            | 30             | 1 500                | 2 000                | 3 200          | 6L                                                                                  |
|                                                                                   | 18.5  | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 130            | 30             | 1 500                | 2 000                | 3 200          | 6L                                                                                  |
|                                                                                   | 21.8  | 55 000                      | 55 000                      | 55 000                      | 45 400                       | 28 000                       | 22 800                         | 130            | 30             | 1 500                | 2 000                | 2 600          | 6K                                                                                  |
|                                                                                   | 25.8  | 53 000                      | 52 000                      | 52 000                      | 44 300                       | 27 400                       | 22 200                         | 130            | 30             | 1 500                | 2 000                | 2 100          | 6G                                                                                  |
|                                                                                   | 28.4  | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 130            | 30             | 1 500                | 2 000                | 2 100          | 6G                                                                                  |
|                                                                                   | 33.6  | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 130            | 30             | 1 500                | 2 000                | 2 100          | 6G                                                                                  |
|                                                                                   | 40.5  | 49 000                      | 42 400                      | 39 000                      | 39 000                       | 27 700                       | 22 500                         | 130            | 30             | 1 500                | 2 000                | 1 500          | 6E                                                                                  |
| <b>L3</b>                                                                         | 51.1  | 52 000                      | 52 000                      | 45 400                      | 36 900                       | 22 800                       | 18 500                         | 60             | 18             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                   | 61.0  | 55 000                      | 55 000                      | 51 000                      | 41 700                       | 25 700                       | 20 900                         | 60             | 18             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                   | 72.0  | 55 000                      | 55 000                      | 50 000                      | 40 800                       | 25 200                       | 20 500                         | 60             | 18             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                   | 78.3  | 55 000                      | 55 000                      | 55 000                      | 45 400                       | 28 000                       | 22 800                         | 60             | 18             | 1 800                | 3 800                | 1 000          | 5K                                                                                  |
|                                                                                   | 92.4  | 55 000                      | 55 000                      | 55 000                      | 45 400                       | 28 000                       | 22 800                         | 60             | 18             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                   | 110   | 53 000                      | 52 000                      | 52 000                      | 44 300                       | 27 400                       | 22 200                         | 60             | 18             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                   | 120   | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 60             | 18             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                   | 135   | 55 000                      | 55 000                      | 55 000                      | 45 400                       | 28 000                       | 22 800                         | 60             | 18             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                   | 151   | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 60             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 163   | 55 000                      | 55 000                      | 48 400                      | 39 300                       | 24 200                       | 19 700                         | 58             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 176   | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 55             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 194   | 53 000                      | 52 000                      | 52 000                      | 44 300                       | 27 300                       | 22 200                         | 49             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 209   | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 48             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 252   | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 40             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 304   | 49 000                      | 42 400                      | 39 000                      | 39 000                       | 27 700                       | 22 500                         | 31             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
| <b>L4</b>                                                                         | 352   | 55 000                      | 51 800                      | 42 100                      | 34 200                       | 21 100                       | 17 100                         | 30             | 11             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 394   | 55 000                      | 55 000                      | 55 000                      | 45 400                       | 28 000                       | 22 800                         | 30             | 11             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 452   | 55 000                      | 55 000                      | 50 000                      | 40 700                       | 25 100                       | 20 400                         | 30             | 11             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 514   | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 30             | 11             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 564   | 55 000                      | 55 000                      | 44 300                      | 36 000                       | 22 200                       | 18 000                         | 29             | 11             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                   | 633   | 52 800                      | 52 000                      | 52 000                      | 44 300                       | 27 400                       | 22 200                         | 26             | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 695   | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 26             | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 790   | 52 800                      | 52 000                      | 52 000                      | 44 300                       | 27 400                       | 22 200                         | 21             | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 889   | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 20             | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 1 014 | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 17             | 11             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                   | 1 117 | 52 800                      | 52 000                      | 52 000                      | 44 300                       | 27 300                       | 22 200                         | 15             | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 266 | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 14             | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 394 | 52 800                      | 52 000                      | 52 000                      | 44 300                       | 27 300                       | 22 200                         | 12             | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 502 | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 12             | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 1 817 | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 10             | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |
|                                                                                   | 2 187 | 49 000                      | 42 400                      | 39 000                      | 39 000                       | 27 700                       | 22 500                         | 8              | 11             | 2 000                | 4 000                | 50             | 4A                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

# M<sub>2</sub> = 50000 Nm

# 313R

|  | i    | M <sub>n2</sub> [Nm]        |                             |                             |                              |                              |                                | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|----------------------------------------------------------------------------------|------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                  | 1:   | n <sub>2</sub> ·h<br>10 000 | n <sub>2</sub> ·h<br>25 000 | n <sub>2</sub> ·h<br>50 000 | n <sub>2</sub> ·h<br>100 000 | n <sub>2</sub> ·h<br>500 000 | n <sub>2</sub> ·h<br>1 000 000 | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>R2 (A)</b>                                                                    | 18.0 | 15 000                      | 14 500                      | 14 500                      | 14 500                       | 9 700                        | 7 900                          | 90             | 75             | 1 500                | 3 500                | 1 000          | 5K                                                                                  |
|                                                                                  | 23.4 | 18 900                      | 18 900                      | 18 900                      | 18 900                       | 11 700                       | 9 500                          | 90             | 75             | 1 500                | 3 500                | 1 000          | 5K                                                                                  |
|                                                                                  | 28.2 | 22 700                      | 22 700                      | 22 700                      | 21 600                       | 13 300                       | 10 800                         | 90             | 75             | 1 500                | 3 500                | 1 000          | 5K                                                                                  |
| <b>R2 (B)</b>                                                                    | 12.2 | 28 500                      | 28 100                      | 25 300                      | 24 100                       | 16 100                       | 12 900                         | 150            | 75             | 1 500                | 2 500                | 3 200          | 6L                                                                                  |
|                                                                                  | 15.9 | 36 700                      | 35 600                      | 31 400                      | 31 400                       | 18 900                       | 15 500                         | 150            | 75             | 1 500                | 2 500                | 3 200          | 6L                                                                                  |
|                                                                                  | 19.1 | 44 100                      | 41 000                      | 37 800                      | 36 000                       | 22 100                       | 17 700                         | 150            | 75             | 1 500                | 2 500                | 3 200          | 6L                                                                                  |
| <b>R2 (C)</b>                                                                    | 16.8 | 40 000                      | 30 100                      | 24 100                      | 19 700                       | 12 000                       | 99 000                         | 150            | 90             | 1 500                | 2 500                | 3 200          | 6L                                                                                  |
|                                                                                  | 22.0 | 47 100                      | 35 600                      | 28 800                      | 23 000                       | 14 400                       | 11 800                         | 150            | 90             | 1 500                | 2 500                | 2 600          | 6K                                                                                  |
|                                                                                  | 26.4 | 49 000                      | 41 000                      | 33 100                      | 26 500                       | 16 400                       | 13 200                         | 150            | 90             | 1 500                | 2 500                | 2 600          | 6K                                                                                  |
| <b>R3</b>                                                                        | 53.7 | 31 400                      | 27 100                      | 24 200                      | 22 300                       | 13 800                       | 11 200                         | 85             | 40             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                  | 64.0 | 36 400                      | 31 400                      | 28 400                      | 25 300                       | 15 600                       | 12 700                         | 85             | 40             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                  | 69.9 | 39 200                      | 33 900                      | 31 000                      | 26 900                       | 16 600                       | 13 500                         | 85             | 40             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                  | 82.2 | 44 900                      | 38 800                      | 36 400                      | 30 100                       | 18 600                       | 15 100                         | 85             | 40             | 1 800                | 3 800                | 630            | 5E                                                                                  |
|                                                                                  | 97.5 | 52 000                      | 44 800                      | 41 800                      | 33 900                       | 20 900                       | 17 000                         | 85             | 40             | 1 800                | 3 800                | 630            | 5E                                                                                  |
|                                                                                  | 107  | 55 000                      | 48 200                      | 44 600                      | 36 200                       | 22 300                       | 18 200                         | 84             | 40             | 1 800                | 3 800                | 630            | 5E                                                                                  |
|                                                                                  | 127  | 55 000                      | 48 200                      | 45 000                      | 40 800                       | 25 200                       | 20 500                         | 73             | 40             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                  | 153  | 49 000                      | 42 400                      | 39 000                      | 39 000                       | 27 700                       | 22 500                         | 55             | 40             | 1 800                | 3 800                | 400            | 5B                                                                                  |
| <b>R4</b>                                                                        | 185  | 49 000                      | 37 200                      | 30 200                      | 24 500                       | 15 100                       | 12 300                         | 35             | 22             | 2 000                | 4 000                | 330            | 4H                                                                                  |
|                                                                                  | 201  | 52 000                      | 39 400                      | 32 000                      | 26 000                       | 16 100                       | 13 000                         | 35             | 22             | 2 000                | 4 000                | 330            | 4H                                                                                  |
|                                                                                  | 237  | 55 000                      | 44 300                      | 36 000                      | 29 200                       | 18 000                       | 14 600                         | 35             | 22             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 281  | 53 000                      | 49 900                      | 40 600                      | 32 900                       | 20 300                       | 16 500                         | 35             | 22             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 309  | 55 000                      | 48 200                      | 43 300                      | 35 200                       | 21 700                       | 17 600                         | 35             | 22             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 346  | 55 000                      | 55 000                      | 46 900                      | 38 100                       | 23 500                       | 19 100                         | 35             | 22             | 2 000                | 4 000                | 260            | 4F                                                                                  |
|                                                                                  | 387  | 55 000                      | 48 200                      | 45 000                      | 41 200                       | 25 400                       | 20 700                         | 35             | 22             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 450  | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 35             | 22             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 496  | 53 000                      | 52 000                      | 52 200                      | 44 300                       | 27 300                       | 22 200                         | 33             | 22             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 535  | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 33             | 22             | 2 000                | 4 000                | 160            | 4D                                                                                  |
|                                                                                  | 647  | 55 000                      | 48 200                      | 45 000                      | 45 000                       | 27 800                       | 22 600                         | 27             | 22             | 2 000                | 4 000                | 100            | 4B                                                                                  |
|                                                                                  | 778  | 49 000                      | 42 400                      | 39 000                      | 39 000                       | 27 700                       | 22 500                         | 22             | 22             | 2 000                | 4 000                | 100            | 4B                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

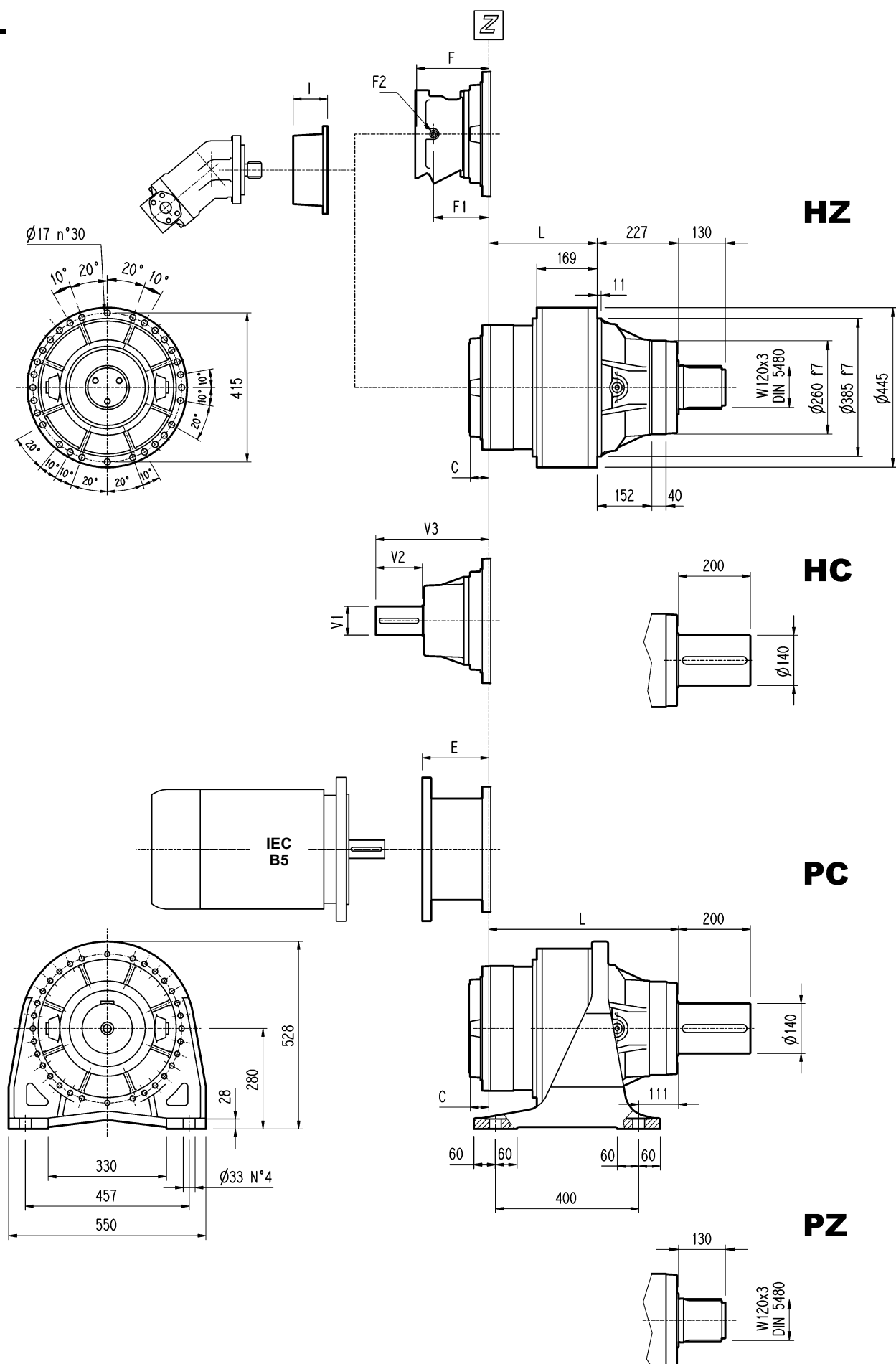
Nota: i contrassegni (A) (B) (C) sulla stessa grandezza, indicano riduzioni angolari di dimensioni differenti: vedere le pagine dimensionali.

Note: Letters (A) (B) (C) near size indication identify different angle reduction dimensions. See pages relevant to dimensions.

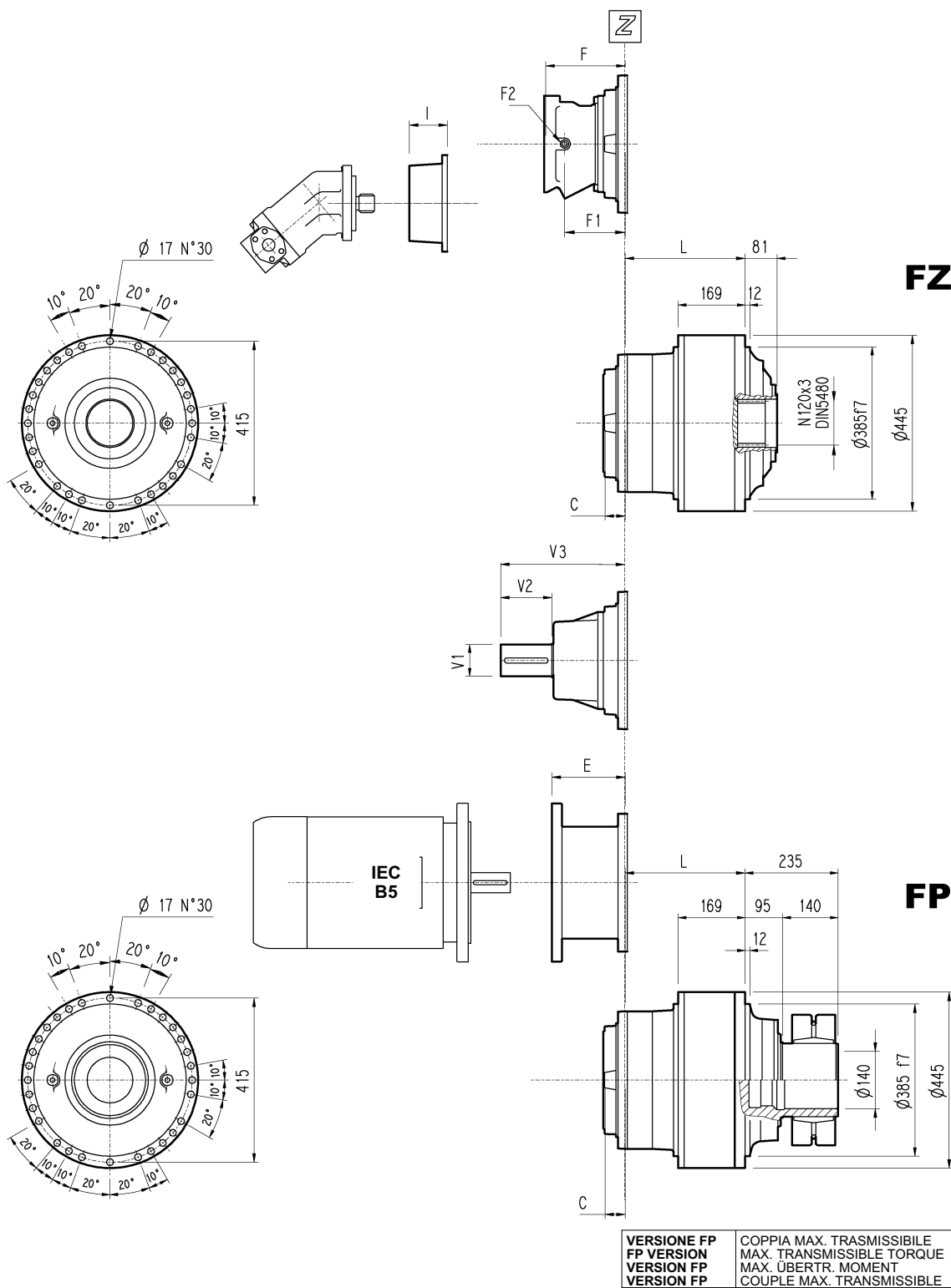
Hinweis: Die Kennzeichnungen (A) (B) (C) an der gleichen Baugröße weisen auf die Winkelreduzierung in unterschiedlichen Maßen hin: siehe Seiten mit Maßtabellen.

Remarque : les indications (A) (B) (C) sur la même taille indique des réductions angulaires de dimensions différentes. Se reporter aux pages des dimensions.

# 313L



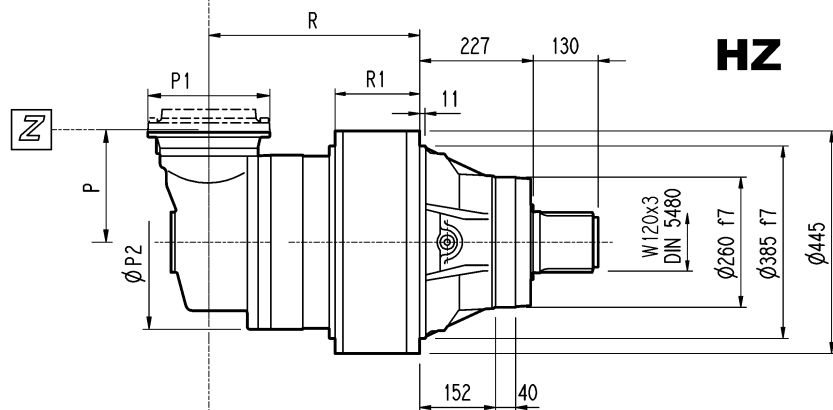
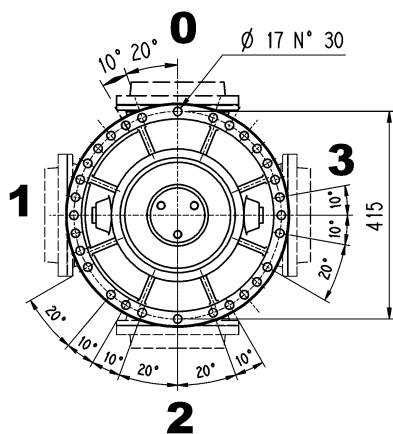
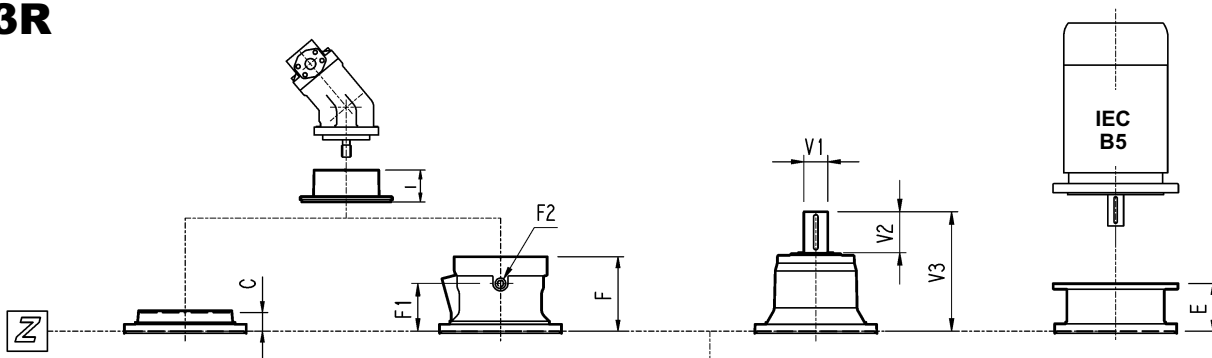
# 313L



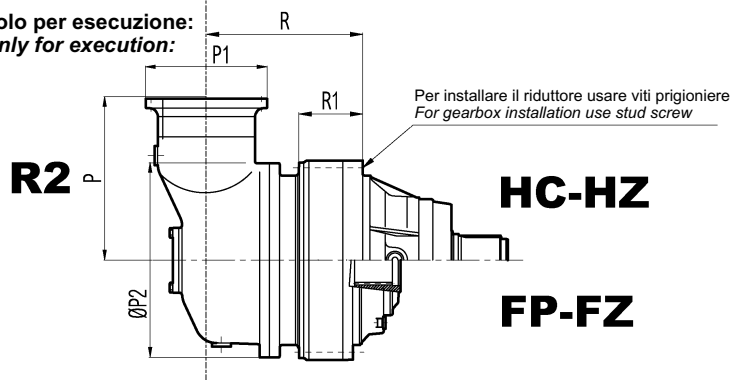
|        | L        |          |     |     |  |          |     |     |  |                                       |         |  |     |       |                             |                                       |                                                                                       |
|--------|----------|----------|-----|-----|-------------------------------------------------------------------------------------|----------|-----|-----|-------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-------|-----------------------------|---------------------------------------|---------------------------------------------------------------------------------------|
|        | HZ<br>HC | PC<br>PZ | FZ  | FP  | HZ<br>HC                                                                            | PC<br>PZ | FZ  | FP  | C                                                                                   | Entrata<br>Input<br>Antrieb<br>Entrée | I                                                                                            | F                                                                                     | F1  | F2    | Tipo<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |  |
| 313 L1 | 154      | 381      | 154 | 154 | 230                                                                                 | 320      | 200 | 200 | 76                                                                                  | D                                     | <br>191 |                                                                                       |     |       |                             |                                       |                                                                                       |
| 313 L2 | 304      | 531      | 304 | 304 | 290                                                                                 | 380      | 260 | 280 | 51                                                                                  | B                                     |                                                                                              | 201                                                                                   | 153 | 1/4 G | 6                           | B                                     | 28                                                                                    |
| 313 L3 | 393      | 620      | 393 | 393 | 302                                                                                 | 392      | 272 | 292 | 37                                                                                  | A                                     |                                                                                              | 145                                                                                   | 95  | 1/4 G | 5                           | A                                     | 16                                                                                    |
| 313 L4 | 458      | 685      | 458 | 458 | 309                                                                                 | 399      | 279 | 299 | 37                                                                                  | A                                     |                                                                                              | 105                                                                                   | 65  | 1/4 G | 4                           | A                                     | 10                                                                                    |

|        | V1 | V2  | V3    |  | V1 | V2  | V3  |  | E |        |        |        |         |         |         |         |         |         |         |         |
|--------|----|-----|-------|-------------------------------------------------------------------------------------|----|-----|-----|---------------------------------------------------------------------------------------|---|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
|        |    |     |       |                                                                                     |    |     |     |                                                                                       |   | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 | IEC 200 | IEC 225 | IEC 250 |
| 313 L1 | 80 | 130 | 343   | 55                                                                                  |    |     |     |                                                                                       |   |        |        |        |         |         |         |         |         |         |         |         |
| 313 L2 | 80 | 130 | 315   | 35                                                                                  | 60 | 105 | 313 | 28                                                                                    |   |        |        |        |         |         |         |         | 195     | 186     | 216     | 215     |
| 313 L3 | 48 | 82  | 239   | 15                                                                                  |    |     |     |                                                                                       |   |        |        |        |         | 114     | 144     | 144     | 174     |         |         |         |
| 313 L4 | 24 | 36  | 137.5 | 6                                                                                   | 38 | 58  | 158 | 7                                                                                     |   | 65     | 84     | 84     | 94      | 94      | 114     | 144     |         |         |         |         |

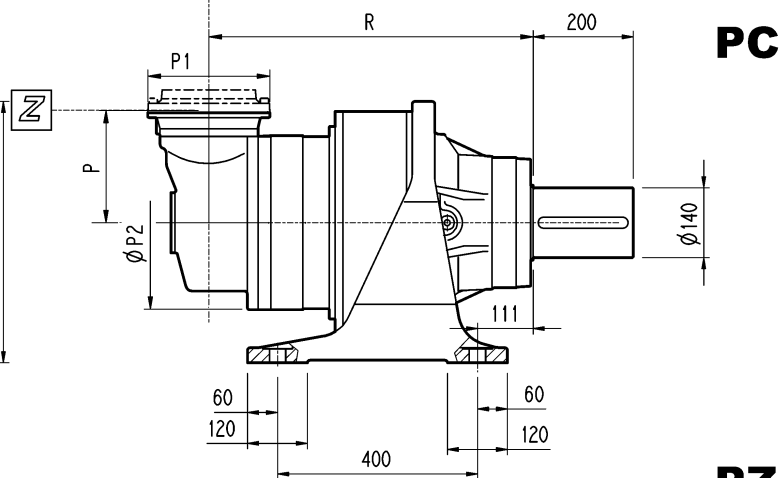
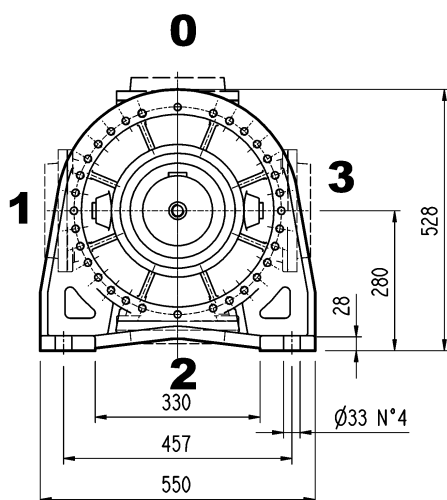
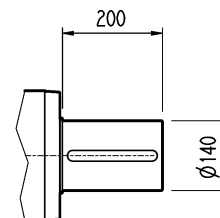
# 313R



Solo per esecuzione:  
Only for execution:

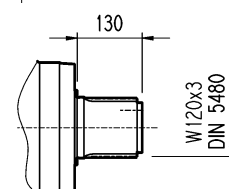


**HC**



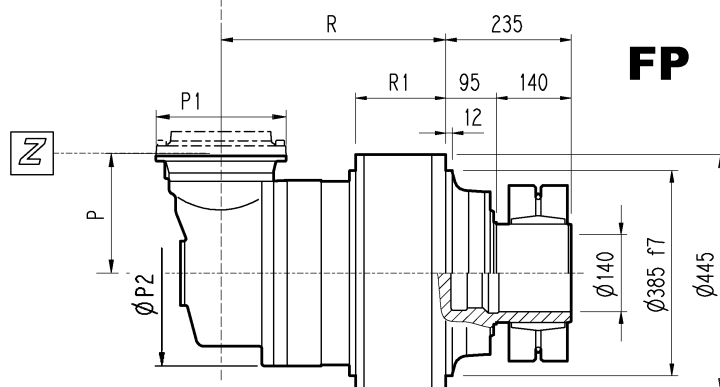
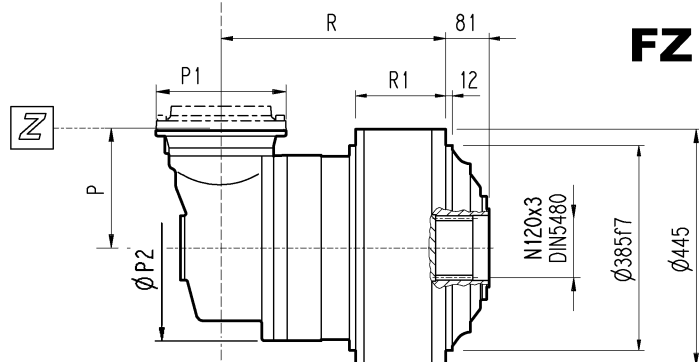
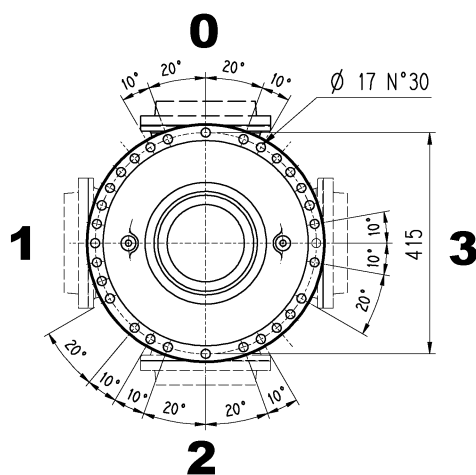
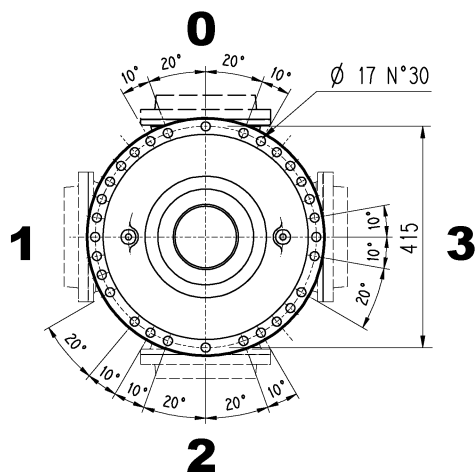
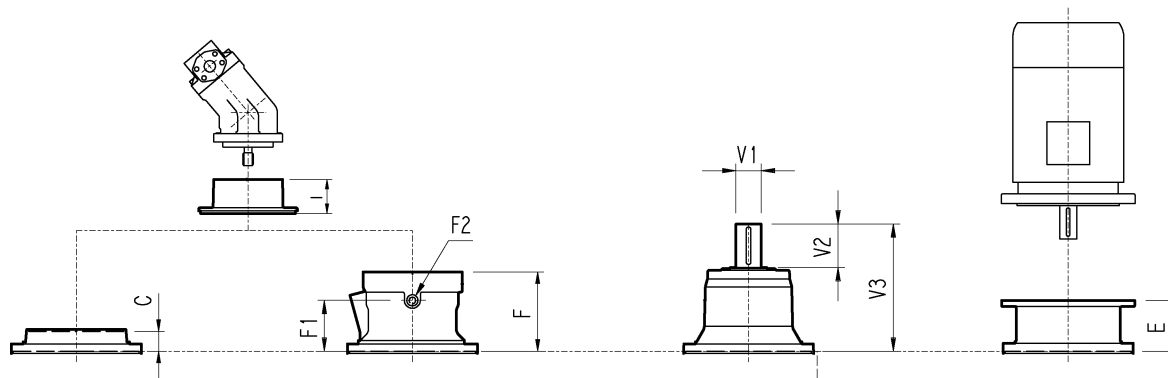
**PC**

**PZ**



# 313R

Z



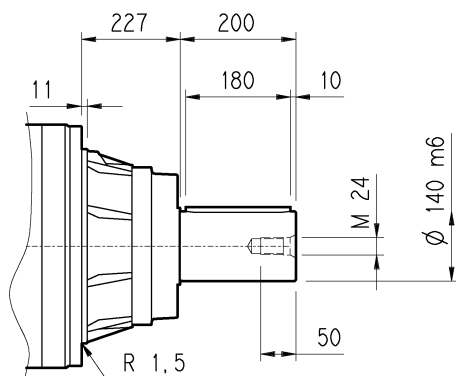
|             |                           |           |
|-------------|---------------------------|-----------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 66 000 Nm |
| FP VERSION  | MAX. TRASMISSIBILE TORQUE |           |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |           |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |           |

|            | R     |       |     |     | R1    |       |     |     | P   | P1  | P2  |  |       |     |     |  |                                    |  |  |     |       |                       |                                    |                                                                                       |
|------------|-------|-------|-----|-----|-------|-------|-----|-----|-----|-----|-----|---------------------------------------------------------------------------------------|-------|-----|-----|---------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-------|-----------------------|------------------------------------|---------------------------------------------------------------------------------------|
|            | HZ HC | PC PZ | FZ  | FP  | HZ HC | PC PZ | FZ  | FP  |     |     |     | HZ HC                                                                                 | PC PZ | FZ  | FP  | C                                                                                     | Entrata Input<br>Antrieb<br>Entrée | I                                                                                     | F                                                                                     | F1  | F2    | Tipo Type<br>Typ Type | Entrata Input<br>Antrieb<br>Entrée |  |
| 313 R2 (B) | 384   | 611   | 384 | 384 | 199   | –     | 199 | 199 | 345 | 292 | 400 | 360                                                                                   | 450   | 330 | 350 | 45                                                                                    | B                                  |  | 195                                                                                   | 147 | 1/4 G | 6                     | B                                  | 28                                                                                    |
| 313 R2 (C) | 384   | 611   | 384 | 384 | 168   | –     | 168 | 168 | 390 | 292 | 480 | 370                                                                                   | 460   | 340 | 360 | 45                                                                                    | B                                  |                                                                                       | 195                                                                                   | 147 | 1/4 G | 6                     | B                                  | 28                                                                                    |
| 313 R2 (A) | 384   | 611   | 384 | 384 | 199   | –     | 199 | 199 | 330 | 245 | 390 | 340                                                                                   | 430   | 310 | 330 | 37                                                                                    | A                                  |                                                                                       | 145                                                                                   | 95  | 1/4 G | 5                     | A                                  | 16                                                                                    |
| 313 R3     | 423   | 650   | 423 | 423 | 169   | –     | 169 | 169 | 225 | 245 | 345 | 340                                                                                   | 430   | 310 | 330 | 37                                                                                    | A                                  |                                                                                       | 145                                                                                   | 95  | 1/4 G | 5                     | A                                  | 16                                                                                    |
| 313 R4     | 485   | 712   | 485 | 485 | 169   | –     | 169 | 169 | 140 | 186 | 244 | 322                                                                                   | 412   | 292 | 312 | 37                                                                                    | A                                  | 191                                                                                   | 105                                                                                   | 95  | 1/4 G | 4                     | A                                  | 10                                                                                    |

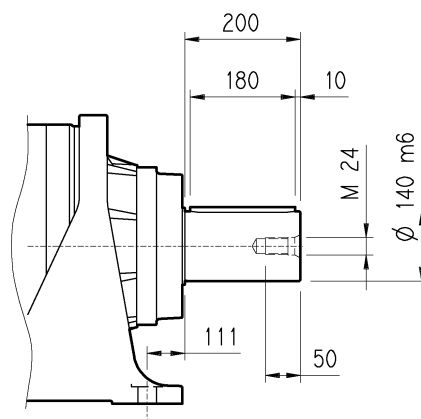
|            | V1 | V2  | V3    |  | V1 | V2 | V3  |  | E      |        |        |         |         |         |         |         |         |         |         |
|------------|----|-----|-------|-------------------------------------------------------------------------------------|----|----|-----|-------------------------------------------------------------------------------------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
|            |    |     |       |                                                                                     |    |    |     |                                                                                     | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 | IEC 200 | IEC 225 | IEC 250 |
| 313 R2 (B) | 60 | 105 | 307   | 23                                                                                  |    |    |     |                                                                                     |        |        |        |         |         |         |         | 152     | 182     | 212     | 193     |
| 313 R2 (C) | 60 | 105 | 307   | 23                                                                                  |    |    |     |                                                                                     |        |        |        |         |         |         |         | 152     | 182     | 212     | 193     |
| 313 R2 (A) | 48 | 82  | 239   | 15                                                                                  |    |    |     |                                                                                     |        |        |        |         | 114     | 144     | 144     | 174     |         |         |         |
| 313 R3     | 48 | 82  | 239   | 15                                                                                  |    |    |     |                                                                                     |        |        |        |         | 114     | 144     | 144     | 174     |         |         |         |
| 313 R4     | 24 | 36  | 137.5 | 6                                                                                   | 38 | 58 | 158 | 7                                                                                   | 65     | 84     | 84     | 94      | 94      | 114     | 144     |         |         |         |         |

# 313L - 313R

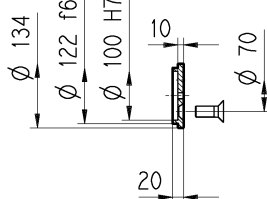
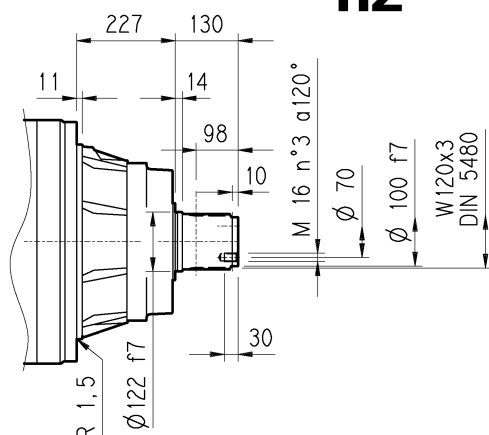
## HC



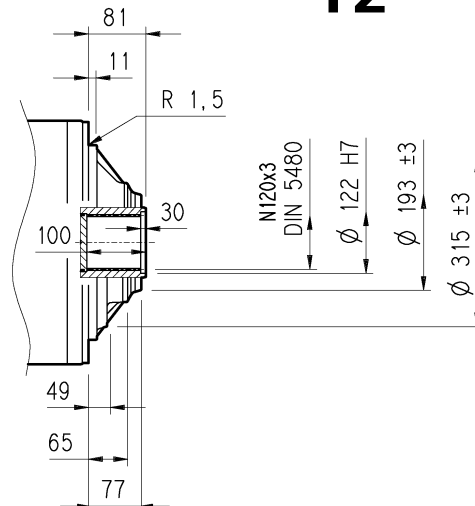
## PC



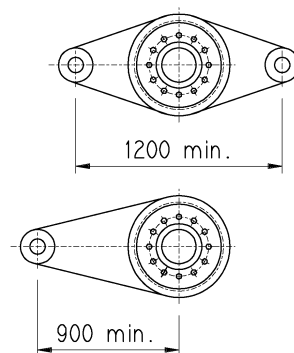
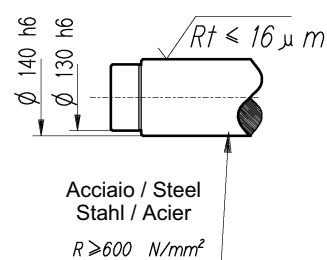
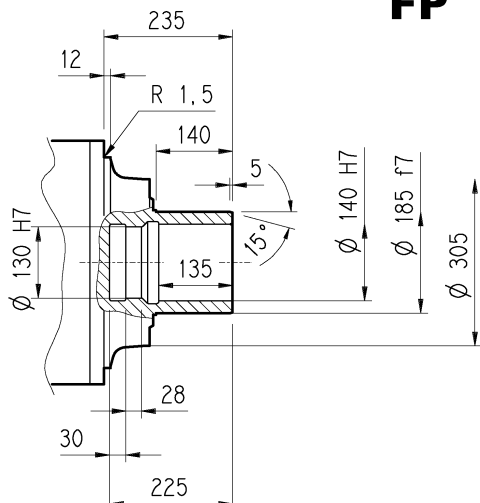
## HZ



## FZ



## FP

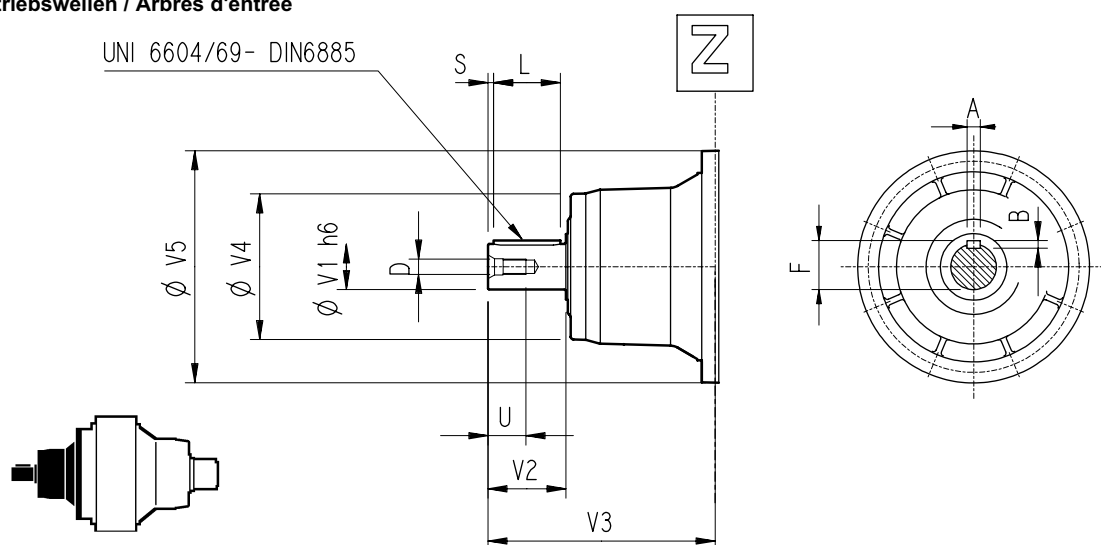


|             |                           |           |
|-------------|---------------------------|-----------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 66 000 Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |           |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |           |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |           |



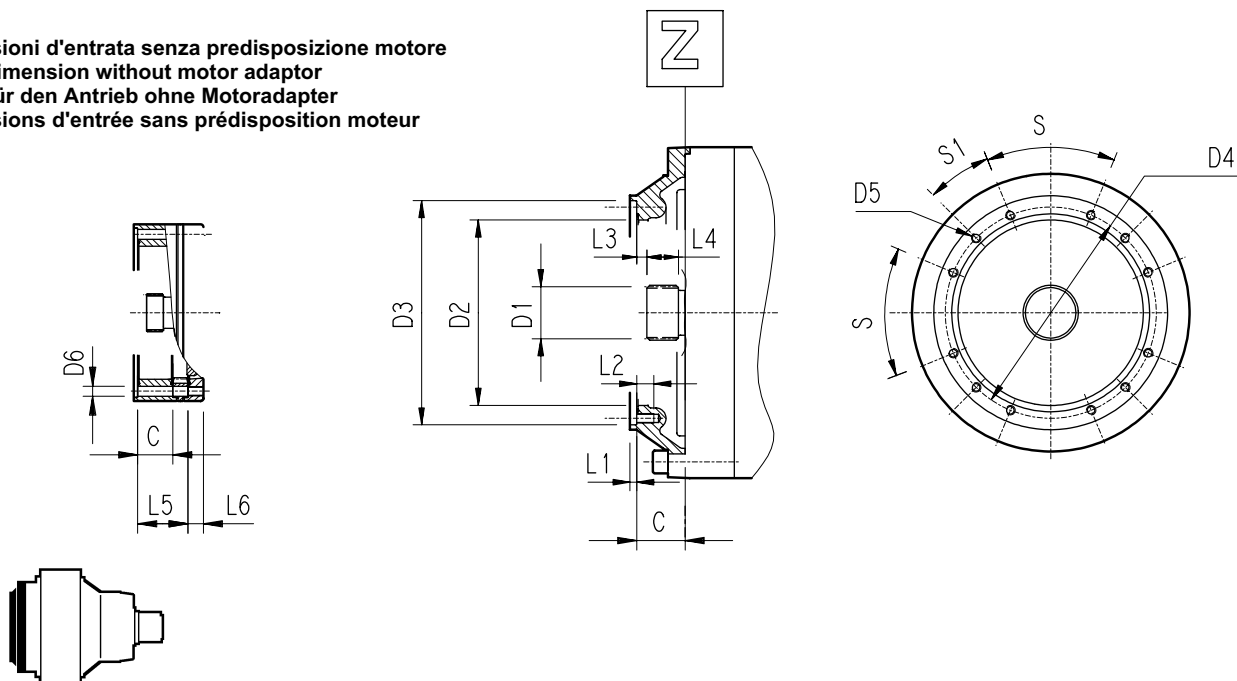
# 313L - 313R

Alberi veloci / Input shaft  
Antriebswellen / Arbres d'entrée



|                | CODE | V1 | V2  | V3    | V4  | V5  | A  | B  | F    | L   | S   | D   | U  |
|----------------|------|----|-----|-------|-----|-----|----|----|------|-----|-----|-----|----|
| 313 L1         | V11B | 80 | 130 | 343   | 200 | 428 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
| 313 L2         | V07B | 80 | 130 | 315   | 200 | 345 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
|                | V07A | 60 | 105 | 313   | 155 | 345 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |
| 313 L3         | V05B | 48 | 82  | 239   | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 313 L4         | V01A | 24 | 36  | 137.5 | 120 | 186 | 8  | 7  | 27   | 30  | 3   | M8  | 19 |
|                | V01B | 38 | 58  | 158   | 120 | 186 | 10 | 8  | 41   | 50  | 4   | M12 | 28 |
| 313 R2 (A)-R3  | V05B | 48 | 82  | 239   | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 313 R2 (B) (C) | V06B | 60 | 105 | 307   | 155 | 292 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |
| 313 R4         | V01A | 24 | 36  | 137.5 | 120 | 186 | 8  | 7  | 27   | 30  | 3   | M8  | 19 |
|                | V01B | 38 | 58  | 158   | 120 | 186 | 10 | 8  | 41   | 50  | 4   | M12 | 28 |

Dimensioni d'entrata senza predisposizione motore  
Input dimension without motor adaptor  
Maße für den Antrieb ohne Motoradapter  
Dimensions d'entrée sans prédisposition moteur



|                | C  | D1             | D2  | D3     | D4  | D5       | D6 | L1 | L2 | L3  | L4 | L5 | L6 | S   | S1    | Entrata<br>Input<br>Antrieb<br>Entrée |
|----------------|----|----------------|-----|--------|-----|----------|----|----|----|-----|----|----|----|-----|-------|---------------------------------------|
| 313 L1         | 75 | 80x74 DIN 5482 | 270 | 335 H7 | 314 | M16 n°8  | /  | 5  | 30 | 9.5 | 40 | /  | /  | 60° | 30°   | D                                     |
| 313 L2         | 51 | 58x53 DIN 5482 | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11  | 22 | /  | /  | 45° | 22.5° | B                                     |
| 313 L3         | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 0  | 4  | 18 | 9   | 18 | 0  | 0  | 45° | 45°   | A                                     |
| 313 L4         | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | 0  | 9   | 18 | 65 | 18 | 45° | 45°   | A                                     |
| 313 R2 (A)-R3  | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | 18 | 9   | 18 | 0  | 0  | 45° | 45°   | A                                     |
| 313 R2 (B) (C) | 45 | 58x53 DIN 5482 | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11  | 22 | /  | /  | 45° | 22.5° | B                                     |
| 313 R4         | 37 | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | /  | 9   | 18 | 37 | 18 | 45° | 45°   | A                                     |

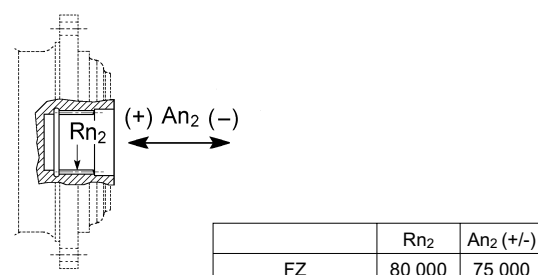
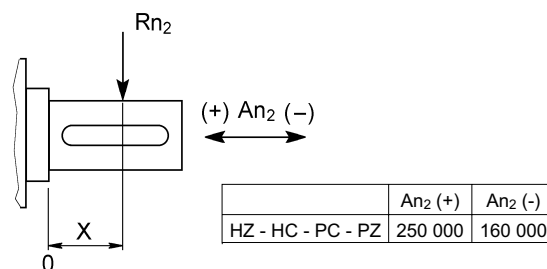
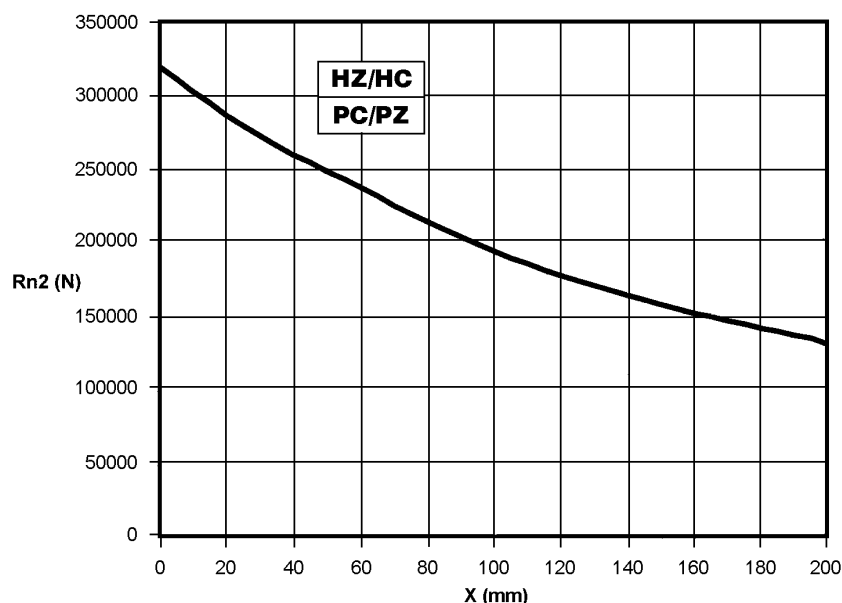
## 313L - 313R

Carichi radiali ed assiali ammissibili sull'albero lento per un valore di  $Fh_2 : n_2 \cdot h = 10\,000$

Permissible radial and axial loads on output shaft with  $Fh_2 : n_2 \cdot h = 10\,000$

An der Ausgangswelle zulässige Radiallasten und Axialkräfte für einen Wert von  $Fh_2 : n_2 \cdot h = 10\,000$

Charges radiales et axiales admissibles sur l'arbre lent pour une valeur de  $Fh_2 : n_2 \cdot h = 10\,000$



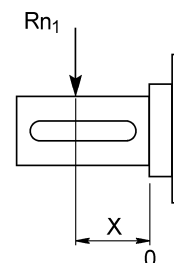
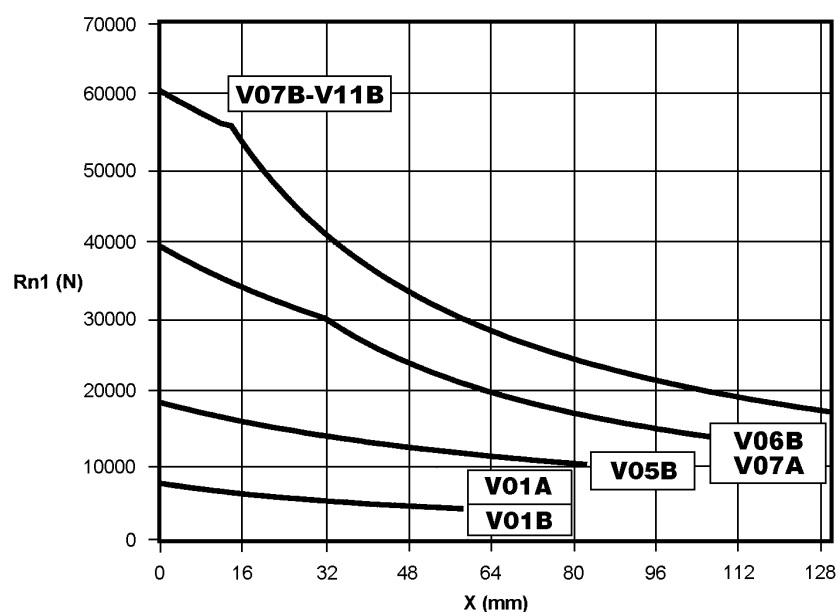
|                                                                                                                                                                                                                                                 |                                      |                   |        |        |        |         |         |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------|--------|--------|--------|---------|---------|-----------|
| Fattore fh <sub>2</sub> correttivo per carichi sugli alberi<br>Load corrective factor fh <sub>2</sub> on shafts<br>Korrektionsfaktor fh <sub>2</sub> für wellenbelastungen<br>Facteur de correction fh <sub>2</sub> pour charges sur les arbres | Fh <sub>2</sub> = n <sub>2</sub> · h |                   | 10 000 | 25 000 | 50 000 | 100 000 | 500 000 | 1 000 000 |
|                                                                                                                                                                                                                                                 | fh <sub>2</sub>                      | FZ                | 1      | 0.74   | 0.58   | 0.46    | 0.27    | 0.21      |
|                                                                                                                                                                                                                                                 |                                      | HZ - HC - PC - PZ | 1      | 0.76   | 0.61   | 0.50    | 0.31    | 0.25      |

Carichi radiali ammissibili sull'albero veloce per un valore di  $Fh_1 : n_1 \cdot h = 250\,000$

Permissible radial loads on input shaft with  $Fh_1 : n_1 \cdot h = 250\,000$

An der Antriebswelle zulässige Radiallasten für einen Wert von  $Fh_1 : n_1 \cdot h = 250\,000$

Charges radiales admises sur l'arbre d'entrée pour une valeur de  $Fh_1 : n_1 \cdot h = 250\,000$



| Fattore $fh_1$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_1$ on shafts<br>Korrektionsfaktor $fh_1$ für wellenbelastungen<br>Facteur de correction $fh_1$ pour charges sur les arbres | $Fh_1 = n_1 \cdot h$ | 250 000 | 500 000 | 1 000 000 | 2 000 000 | 5 000 000 | 10 000 000 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|---------|-----------|-----------|-----------|------------|
|                                                                                                                                                                                                             | $fh_1$               | 1       | 0.79    | 0.63      | 0.50      | 0.37      | 0.29       |

# 315L

**M<sub>2</sub> = 80000 Nm**

|  | i     | M <sub>n2</sub> [Nm]        |                             |                             |                              |                              |                                | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|-----------------------------------------------------------------------------------|-------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                   | 1:    | n <sub>2</sub> ·h<br>10 000 | n <sub>2</sub> ·h<br>25 000 | n <sub>2</sub> ·h<br>50 000 | n <sub>2</sub> ·h<br>100 000 | n <sub>2</sub> ·h<br>500 000 | n <sub>2</sub> ·h<br>1 000 000 | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>L1</b>                                                                         | 4.09  | 105 000                     | 100 000                     | 97 000                      | 85 000                       | 53 000                       | 42 800                         | 260            | 60             | 350                  | 500                  |                |                                                                                     |
|                                                                                   | 5.25  | 99 000                      | 87 000                      | 79 000                      | 78 000                       | 49 000                       | 39 700                         | 260            | 60             | 350                  | 500                  |                |                                                                                     |
|                                                                                   | 6.23  | 80 000                      | 70 000                      | 65 000                      | 65 000                       | 41 000                       | 33 300                         | 260            | 60             | 350                  | 500                  |                |                                                                                     |
| <b>L2</b>                                                                         | 16.7  | 105 000                     | 100 000                     | 97 000                      | 79 000                       | 48 700                       | 39 600                         | 180            | 45             | 750                  | 1 000                |                |                                                                                     |
|                                                                                   | 21.5  | 105 000                     | 100 000                     | 97 000                      | 83 000                       | 51 000                       | 41 700                         | 180            | 45             | 750                  | 1 000                |                |                                                                                     |
|                                                                                   | 25.5  | 105 000                     | 100 000                     | 97 000                      | 78 000                       | 48 400                       | 39 400                         | 180            | 45             | 750                  | 1 000                |                |                                                                                     |
|                                                                                   | 27.6  | 99 000                      | 87 000                      | 79 000                      | 78 000                       | 48 800                       | 39 700                         | 180            | 45             | 750                  | 1 000                |                |                                                                                     |
|                                                                                   | 32.7  | 99 000                      | 87 000                      | 79 000                      | 78 000                       | 48 800                       | 39 700                         | 180            | 45             | 750                  | 1 000                |                |                                                                                     |
|                                                                                   | 38.8  | 80 000                      | 70 000                      | 65 000                      | 65 000                       | 41 000                       | 33 300                         | 157            | 45             | 750                  | 1 000                |                |                                                                                     |
| <b>L3</b>                                                                         | 57.4  | 105 000                     | 100 000                     | 97 000                      | 79 000                       | 48 700                       | 39 600                         | 100            | 30             | 1 500                | 2 500                | 2 600          | 6K                                                                                  |
|                                                                                   | 68.5  | 105 000                     | 100 000                     | 97 000                      | 79 000                       | 48 700                       | 39 600                         | 100            | 30             | 1 500                | 2 500                | 2 100          | 6G                                                                                  |
|                                                                                   | 87.9  | 105 000                     | 100 000                     | 97 000                      | 79 000                       | 48 700                       | 39 600                         | 100            | 30             | 1 500                | 2 500                | 1 500          | 6E                                                                                  |
|                                                                                   | 104   | 105 000                     | 100 000                     | 97 000                      | 79 000                       | 48 700                       | 39 600                         | 100            | 30             | 1 500                | 2 500                | 1 100          | 6C                                                                                  |
|                                                                                   | 134   | 105 000                     | 100 000                     | 97 000                      | 83 000                       | 51 000                       | 41 700                         | 100            | 30             | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                   | 159   | 105 000                     | 100 000                     | 97 000                      | 78 000                       | 48 400                       | 39 400                         | 100            | 30             | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                   | 172   | 99 000                      | 87 000                      | 79 000                      | 78 000                       | 48 800                       | 39 700                         | 100            | 30             | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                   | 204   | 99 000                      | 87 000                      | 79 000                      | 78 000                       | 48 800                       | 39 700                         | 87             | 30             | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                   | 242   | 80 000                      | 70 000                      | 65 000                      | 65 000                       | 41 000                       | 33 300                         | 61             | 30             | 1 500                | 2 500                | 850            | 6B                                                                                  |
| <b>L4</b>                                                                         | 291   | 105 000                     | 100 000                     | 97 000                      | 79 000                       | 48 700                       | 39 600                         | 60             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 356   | 105 000                     | 100 000                     | 97 000                      | 79 000                       | 48 700                       | 39 600                         | 60             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 424   | 105 000                     | 100 000                     | 97 000                      | 79 000                       | 48 700                       | 39 600                         | 59             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 469   | 105 000                     | 100 000                     | 97 000                      | 79 000                       | 48 700                       | 39 600                         | 53             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 513   | 105 000                     | 100 000                     | 97 000                      | 79 000                       | 48 700                       | 39 600                         | 48             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 569   | 105 000                     | 100 000                     | 97 000                      | 83 000                       | 51 000                       | 41 700                         | 44             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 647   | 105 000                     | 100 000                     | 97 000                      | 79 000                       | 48 700                       | 39 600                         | 38             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 714   | 105 000                     | 100 000                     | 97 000                      | 83 000                       | 51 000                       | 41 700                         | 35             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 830   | 105 000                     | 100 000                     | 97 000                      | 83 000                       | 51 000                       | 41 700                         | 30             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 916   | 99 000                      | 87 000                      | 79 000                      | 78 000                       | 48 800                       | 39 700                         | 27             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 1 004 | 105 000                     | 100 000                     | 97 000                      | 83 000                       | 51 000                       | 41 700                         | 25             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 1 087 | 99 000                      | 87 000                      | 79 000                      | 78 000                       | 48 800                       | 39 700                         | 23             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 1 264 | 99 000                      | 87 000                      | 79 000                      | 78 000                       | 48 800                       | 39 700                         | 19.7           | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 1 500 | 80 000                      | 70 000                      | 65 000                      | 65 000                       | 41 000                       | 33 300                         | 16.6           | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 1 814 | 80 000                      | 70 000                      | 65 000                      | 65 000                       | 41 000                       | 33 300                         | 13.7           | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

# M<sub>2</sub> = 80000 Nm

# 315R

|  | i    | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|----------------------------------------------------------------------------------|------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                  |      | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h |                |                |                      |                      |                |                                                                                     |
|                                                                                  | 1:   | 10 000               | 25 000            | 50 000            | 100 000           | 500 000           | 1 000 000         | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>R3 (A)</b>                                                                    | 72.5 | 57 000               | 57 000            | 50 000            | 40 600            | 25 100            | 20 300            | 135            | 75             | 1 500                | 2 500                | 1 000          | 5K                                                                                  |
|                                                                                  | 93.1 | 73 000               | 73 000            | 60 000            | 48 300            | 29 800            | 24 200            | 135            | 75             | 1 500                | 2 500                | 1 000          | 5K                                                                                  |
|                                                                                  | 110  | 86 000               | 83 000            | 67 000            | 55 000            | 33 600            | 27 300            | 135            | 75             | 1 500                | 2 500                | 1 000          | 5K                                                                                  |
|                                                                                  | 119  | 93 000               | 87 000            | 71 000            | 58 000            | 35 500            | 28 900            | 135            | 75             | 1 500                | 2 500                | 1 000          | 5K                                                                                  |
|                                                                                  | 142  | 99 000               | 87 000            | 79 000            | 65 000            | 40 000            | 32 500            | 119            | 75             | 1 500                | 2 500                | 800            | 5G                                                                                  |
|                                                                                  | 168  | 80 000               | 70 000            | 65 000            | 65 000            | 41 000            | 33 300            | 83             | 75             | 1 500                | 2 500                | 500            | 5C                                                                                  |
| <b>R3 (B)</b>                                                                    | 49.2 | 102 000              | 94 000            | 82 000            | 66 000            | 39 300            | 32 300            | 150            | 75             | 1 500                | 2 500                | 2600           | 6K                                                                                  |
|                                                                                  | 63.1 | 105 000              | 100 000           | 97 000            | 80 000            | 48 500            | 38 400            | 150            | 75             | 1 500                | 2 500                | 2100           | 6G                                                                                  |
|                                                                                  | 74.9 | 105 000              | 100 000           | 97 000            | 78 000            | 48 800            | 39 400            | 150            | 75             | 1 500                | 2 500                | 2100           | 6G                                                                                  |
|                                                                                  | 81.0 | 99 000               | 87 000            | 79 000            | 78 000            | 48 800            | 39 700            | 150            | 75             | 1 500                | 2 500                | 1500           | 6E                                                                                  |
|                                                                                  | 96.2 | 99 000               | 87 000            | 79 000            | 78 000            | 48 800            | 39 700            | 150            | 75             | 1 500                | 2 500                | 1500           | 6E                                                                                  |
|                                                                                  | 114  | 80 000               | 70 000            | 65 000            | 65 000            | 41 000            | 33 300            | 118            | 75             | 1 500                | 2 500                | 850            | 6B                                                                                  |
| <b>R3 (C)</b>                                                                    | 68.0 | 99 000               | 75 000            | 61 000            | 49 600            | 30 700            | 25 200            | 150            | 90             | 1 500                | 2 500                | 2100           | 6G                                                                                  |
|                                                                                  | 87.3 | 105 000              | 88 000            | 73 000            | 59 000            | 37 400            | 30 300            | 150            | 90             | 1 500                | 2 500                | 1500           | 6E                                                                                  |
|                                                                                  | 104  | 105 000              | 100 000           | 77 000            | 67 000            | 40 800            | 33 600            | 150            | 90             | 1 500                | 2 500                | 1500           | 6E                                                                                  |
|                                                                                  | 112  | 99 000               | 87 000            | 79 000            | 70 000            | 44 100            | 36 300            | 148            | 90             | 1 500                | 2 500                | 1100           | 6C                                                                                  |
|                                                                                  | 133  | 99 000               | 87 000            | 79 000            | 78 000            | 48 800            | 39 700            | 127            | 90             | 1 500                | 2 500                | 1100           | 6C                                                                                  |
|                                                                                  | 158  | 80 000               | 70 000            | 65 000            | 65 000            | 41 000            | 33 300            | 88             | 90             | 1 500                | 2 500                | 850            | 6B                                                                                  |
| <b>R4</b>                                                                        | 217  | 98 000               | 87 000            | 71 000            | 58 000            | 35 500            | 28 900            | 90             | 40             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                  | 259  | 105 000              | 99 000            | 80 000            | 65 000            | 40 200            | 32 600            | 90             | 40             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                  | 332  | 105 000              | 100 000           | 95 000            | 78 000            | 47 900            | 38 900            | 75             | 40             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                  | 394  | 105 000              | 100 000           | 97 000            | 79 000            | 48 700            | 39 600            | 63             | 40             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                  | 506  | 105 000              | 100 000           | 97 000            | 83 000            | 51 000            | 41 700            | 49             | 40             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                  | 600  | 105 000              | 100 000           | 97 000            | 78 000            | 48 400            | 39 300            | 41             | 40             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                  | 649  | 99 000               | 87 000            | 79 000            | 78 000            | 48 800            | 39 700            | 38             | 40             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                  | 770  | 99 000               | 87 000            | 79 000            | 78 000            | 48 800            | 39 700            | 32             | 40             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                  | 914  | 80 000               | 70 000            | 65 000            | 65 000            | 41 000            | 33 300            | 26             | 40             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                  |      |                      |                   |                   |                   |                   |                   |                |                |                      |                      |                |                                                                                     |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

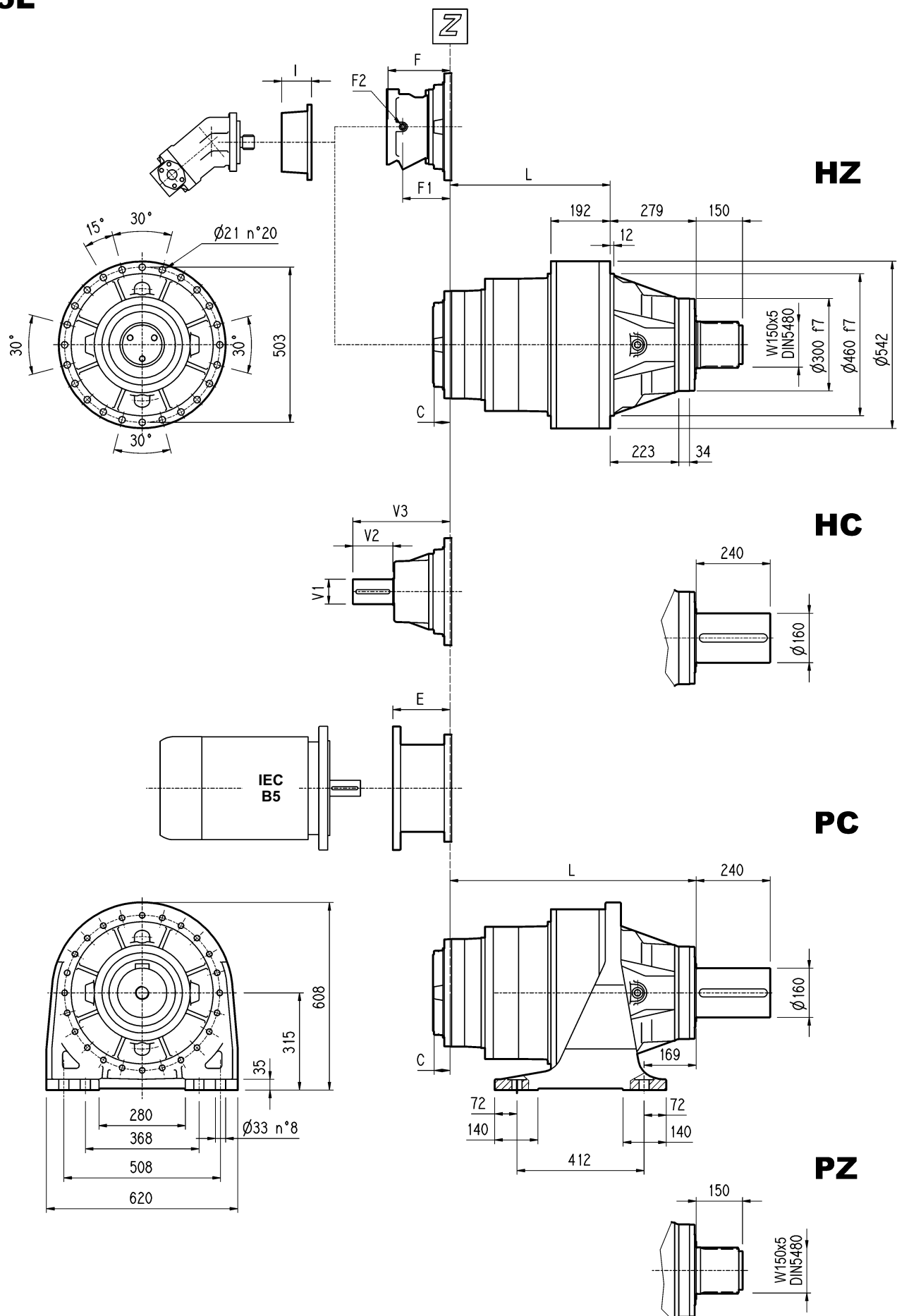
Nota: i contrassegni (A) (B) (C) sulla stessa grandezza, indicano riduzioni angolari di dimensioni differenti: vedere le pagine dimensionali.

Note: Letters (A) (B) (C) near size indication identify different angle reduction dimensions. See pages relevant to dimensions.

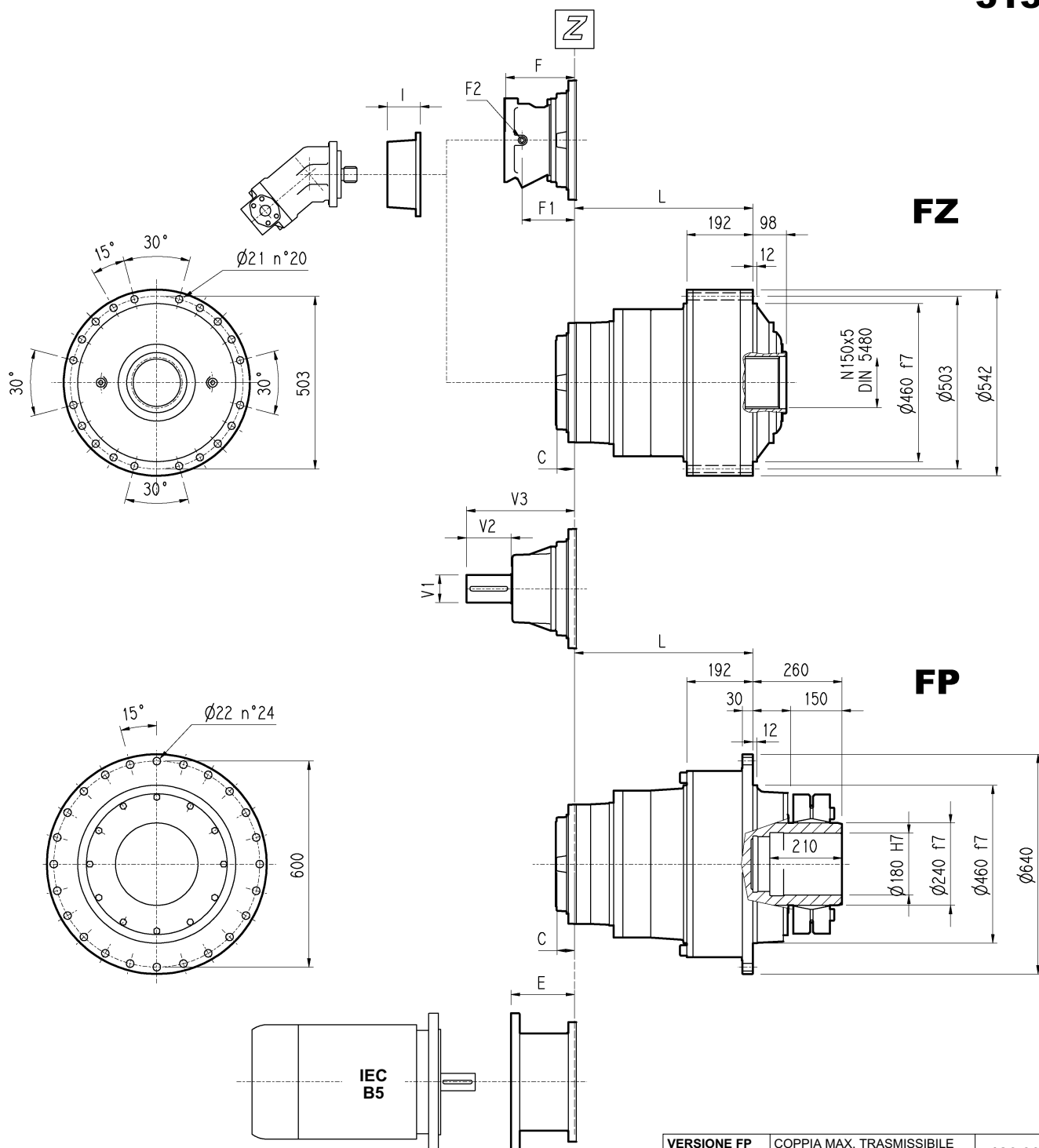
Hinweis: Die Kennzeichnungen (A) (B) (C) an der gleichen Baugröße weisen auf die Winkelreduzierung in unterschiedlichen Maßen hin: siehe Seiten mit Maßtabellen.

Remarque : les indications (A) (B) (C) sur la même taille indique des réductions angulaires de dimensions différentes. Se reporter aux pages des dimensions.

# 315L



# 315L

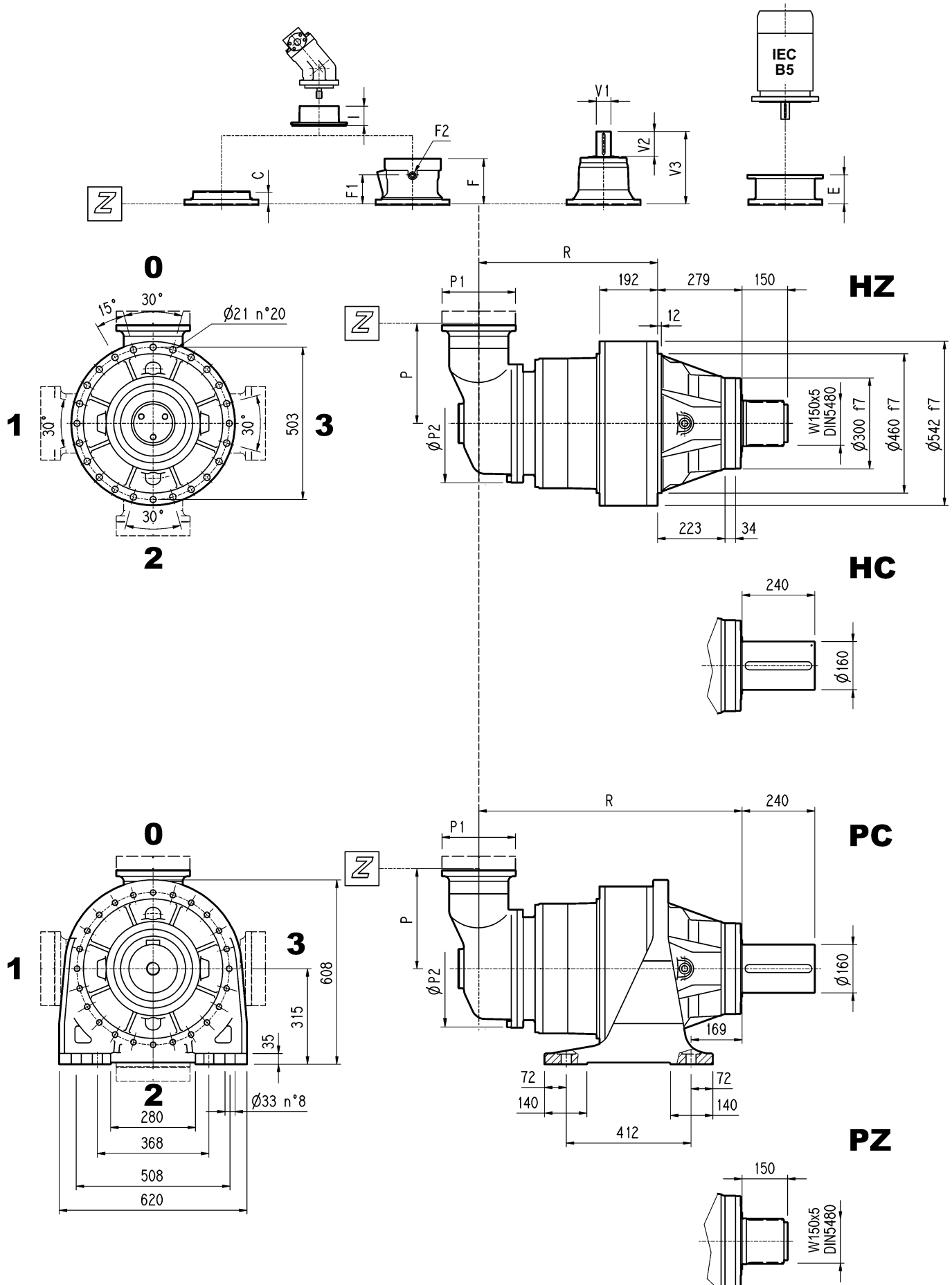


|             |                           |               |
|-------------|---------------------------|---------------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 126 000<br>Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |               |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |               |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |               |

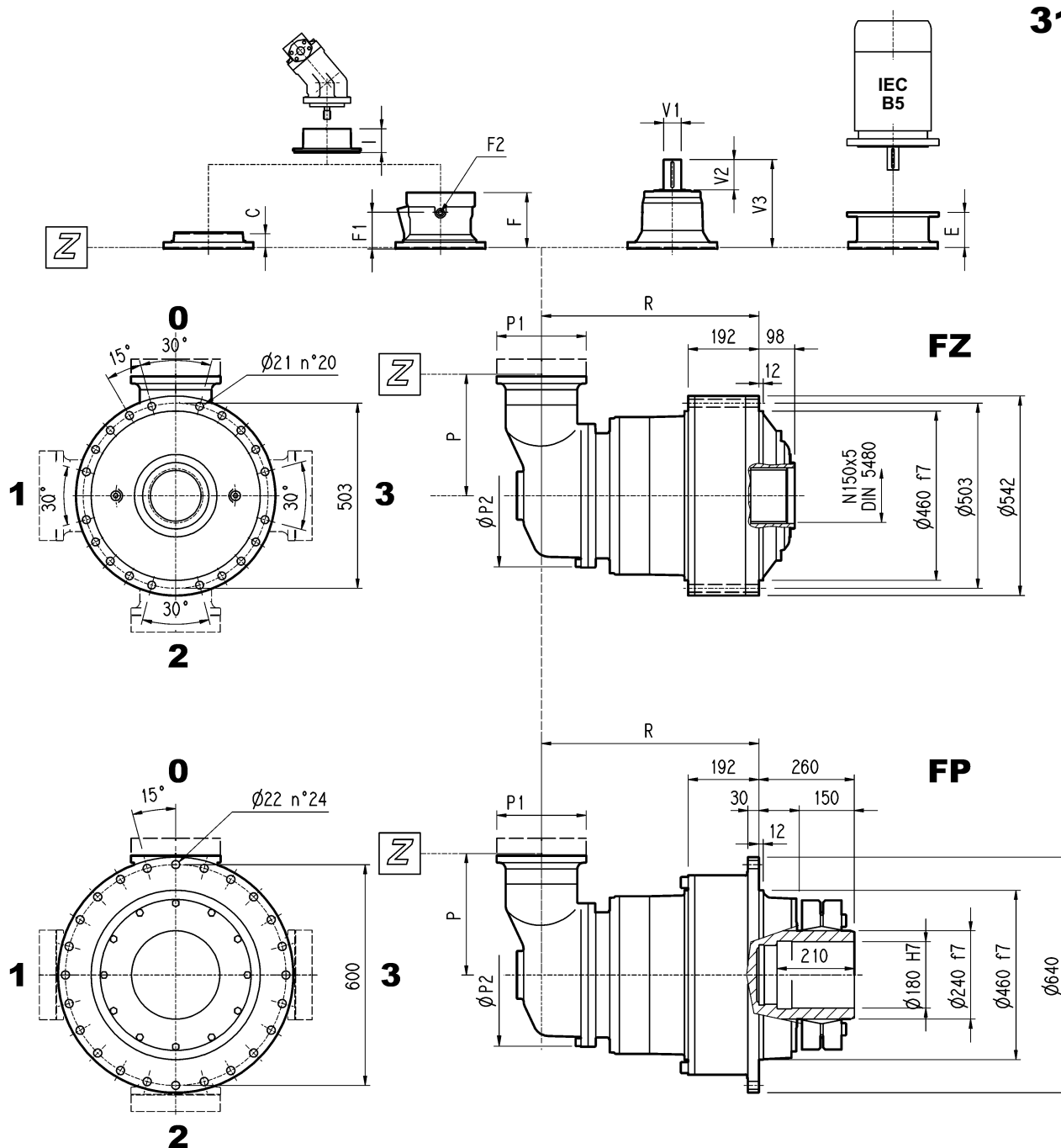
|        | L     |       |     |     | Kg    |       |     |     |     |                              |     |     |     |       |                    |                              |    |
|--------|-------|-------|-----|-----|-------|-------|-----|-----|-----|------------------------------|-----|-----|-----|-------|--------------------|------------------------------|----|
|        | HZ HC | PC PZ | FZ  | FP  | HZ HC | PC PZ | FZ  | FP  | C   | Entrata Input Antrieb Entrée |     | F   | F1  | F2    | Tipo Type Typ Type | Entrata Input Antrieb Entrée | Kg |
| 315 L1 | 174   | 453   | 174 | 174 | 370   | 500   | 280 | 330 | 116 | E                            | 191 |     |     |       |                    |                              |    |
| 315 L2 | 386   | 665   | 386 | 386 | 455   | 585   | 365 | 415 | 81  | D                            |     | 232 | 185 | 1/4 G | 6                  | B                            | 35 |
| 315 L3 | 519   | 798   | 519 | 519 | 500   | 630   | 410 | 460 | 51  | B                            |     | 201 | 153 | 1/4 G | 6                  | B                            | 28 |
| 315 L4 | 608   | 887   | 608 | 608 | 512   | 642   | 422 | 472 | 37  | A                            |     | 145 | 95  | 1/4 G | 5                  | A                            | 16 |

|        | V1 | V2  | V3  |  | V1 | V2  | V3  |  | E |  |  |  |  |     |     |         |         |         |         |
|--------|----|-----|-----|-------------------------------------------------------------------------------------|----|-----|-----|---------------------------------------------------------------------------------------|---|--|--|--|--|-----|-----|---------|---------|---------|---------|
|        |    |     |     |                                                                                     |    |     |     |                                                                                       |   |  |  |  |  |     |     | IEC 132 | IEC 160 | IEC 180 | IEC 200 |
| 315 L1 |    |     |     |                                                                                     |    |     |     |                                                                                       |   |  |  |  |  |     |     |         |         |         |         |
| 315 L2 | 80 | 130 | 348 | 35                                                                                  |    |     |     |                                                                                       |   |  |  |  |  |     |     |         |         |         |         |
| 315 L3 | 80 | 130 | 315 | 35                                                                                  | 60 | 105 | 313 | 28                                                                                    |   |  |  |  |  |     |     | 195     | 186     | 216     | 215     |
| 315 L4 | 48 | 82  | 239 | 15                                                                                  |    |     |     |                                                                                       |   |  |  |  |  | 114 | 144 | 144     | 174     |         |         |

# 315R



# 315R



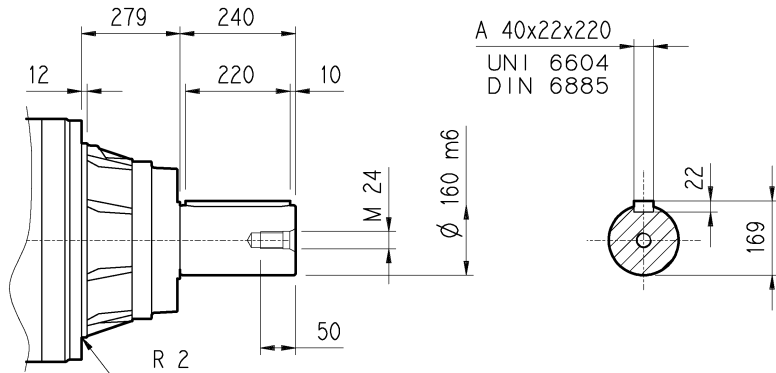
|                                                       |                                                                                                            |               |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | 126 000<br>Nm |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------|

|            | R        |          |     |     | P   | P1  | P2  |  |          |     |     |  |                                       |         |  |     |       |                             |                                       |                                                                                       |
|------------|----------|----------|-----|-----|-----|-----|-----|-------------------------------------------------------------------------------------|----------|-----|-----|-------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-------|-----------------------------|---------------------------------------|---------------------------------------------------------------------------------------|
|            | HZ<br>HC | PC<br>PZ | FZ  | FP  |     |     |     | HZ<br>HC                                                                            | PC<br>PZ | FZ  | FP  | C                                                                                   | Entrata<br>Input<br>Antrieb<br>Entrée |                                                                                              | F                                                                                     | F1  | F2    | Tipo<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |  |
| 315 R3 (B) | 611      | 890      | 611 | 611 | 345 | 262 | 400 | 590                                                                                 | 720      | 500 | 550 | 45                                                                                  | B                                     | <br>191 | 195                                                                                   | 147 | 1/4 G | 6                           | B                                     | 28                                                                                    |
| 315 R3 (C) | 611      | 890      | 611 | 611 | 390 | 262 | 480 | 600                                                                                 | 730      | 510 | 560 | 45                                                                                  | B                                     |                                                                                              | 195                                                                                   | 147 | 1/4 G | 6                           | B                                     | 28                                                                                    |
| 315 R3 (A) | 611      | 890      | 611 | 611 | 330 | 245 | 390 | 565                                                                                 | 695      | 475 | 525 | 37                                                                                  | A                                     |                                                                                              | 145                                                                                   | 95  | 1/4 G | 5                           | A                                     | 16                                                                                    |
| 315 R4     | 638      | 917      | 638 | 638 | 225 | 245 | 345 | 550                                                                                 | 680      | 460 | 510 | 37                                                                                  | A                                     |                                                                                              | 145                                                                                   | 95  | 1/4 G | 5                           | A                                     | 16                                                                                    |

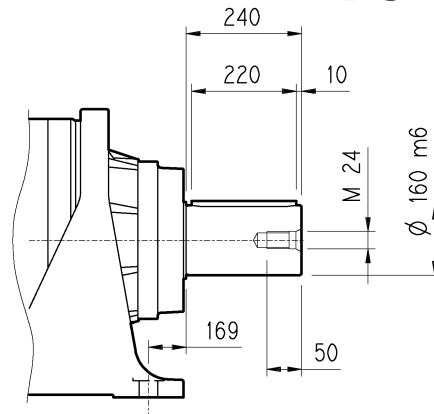
|            | V1 | V2  | V3  |  | V1 | V2 | V3 |  | E      |        |        |         |         |         |         |         |         |         |         |
|------------|----|-----|-----|-------------------------------------------------------------------------------------|----|----|----|---------------------------------------------------------------------------------------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
|            |    |     |     |                                                                                     |    |    |    |                                                                                       | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 | IEC 200 | IEC 225 | IEC 250 |
| 315 R3 (B) | 60 | 105 | 307 | 23                                                                                  |    |    |    |                                                                                       |        |        |        |         |         |         |         | 152     | 182     | 212     | 193     |
| 315 R3 (C) | 60 | 105 | 307 | 23                                                                                  |    |    |    |                                                                                       |        |        |        |         |         |         |         | 152     | 182     | 212     | 193     |
| 315 R3 (A) | 48 | 82  | 239 | 15                                                                                  |    |    |    |                                                                                       |        |        |        |         | 114     | 144     | 144     | 174     |         |         |         |
| 315 R4     | 48 | 82  | 239 | 15                                                                                  |    |    |    |                                                                                       |        |        |        |         | 114     | 144     | 144     | 174     |         |         |         |

# 315L - 315R

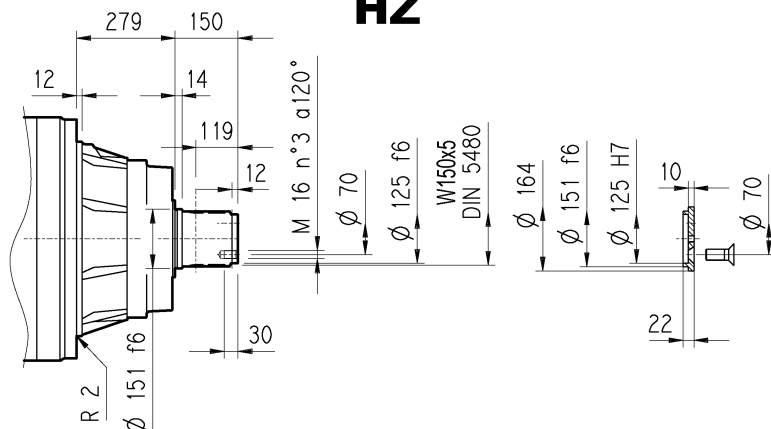
## HC



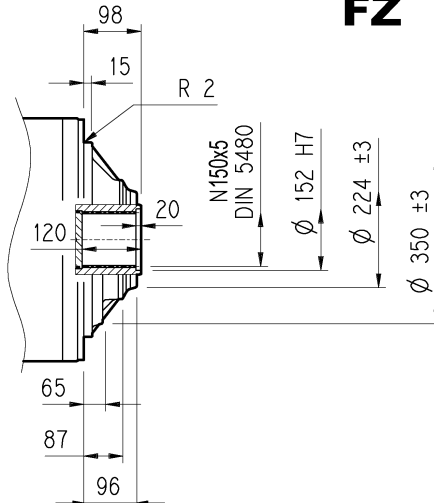
## PC



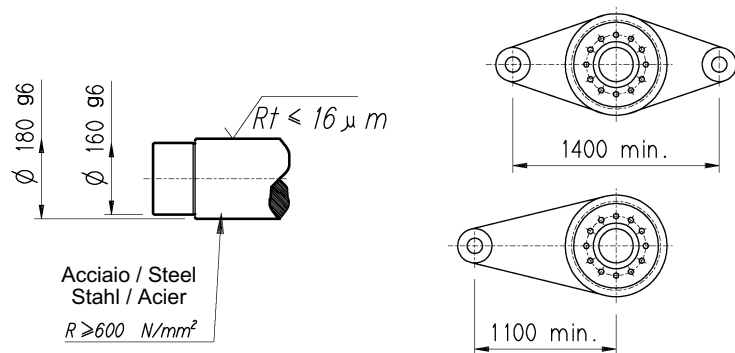
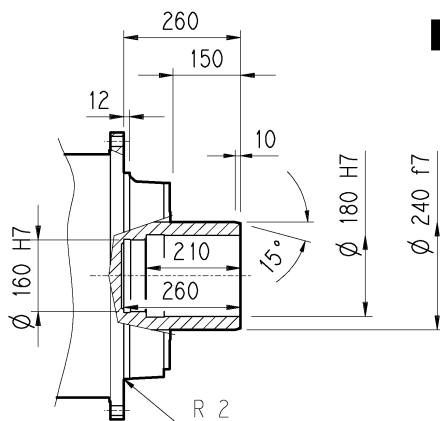
## HZ



## FZ

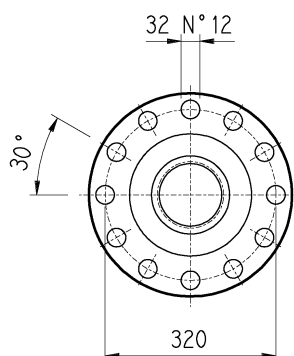
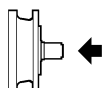


## FP

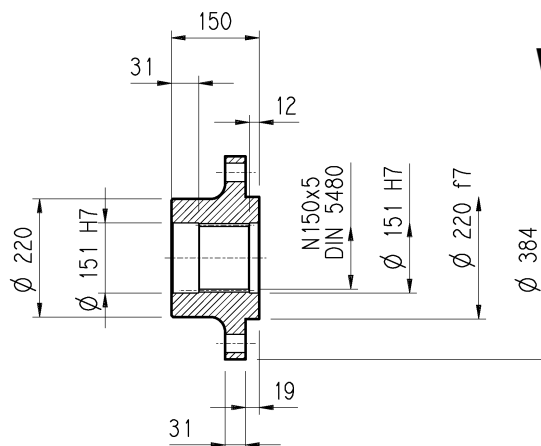


|             |                           |         |
|-------------|---------------------------|---------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 126 000 |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE | Nm      |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |         |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |         |

**Flangia / Flange**  
**Flansch / Brides**

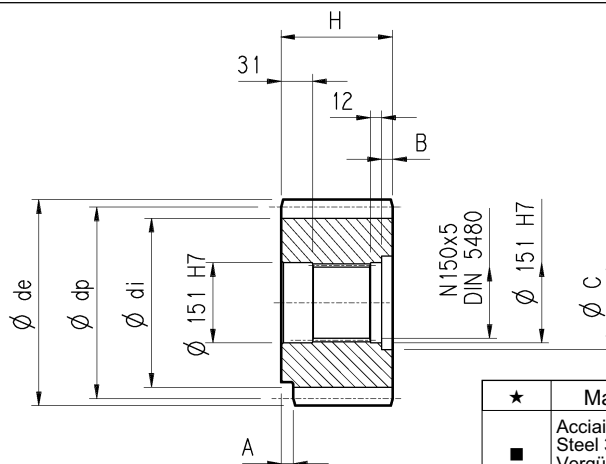
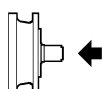


Materiale : Acciaio C40  
Material : Steel C40  
Material : Stahl C40  
Màterial : Acier C40



**W0A**

**Pignoni per rotazione / Output pinions**  
**Ritzel / Pignons**

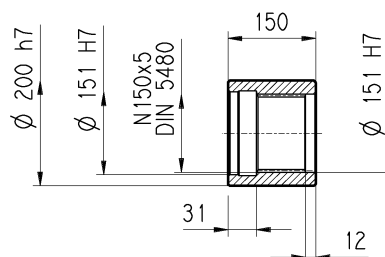
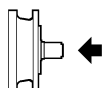


**P...**

|      | m  | z  | x     | dp  | di  | de  | H   | A  | B  | C   | ★ |
|------|----|----|-------|-----|-----|-----|-----|----|----|-----|---|
| PRG1 | 18 | 16 | 0.500 | 288 | 261 | 342 | 160 | 0  | 10 | 166 | □ |
| PRG2 | 18 | 16 | 0.617 | 288 | 271 | 339 | 150 | 30 | 0  | 0   | ■ |

| ★ | Materiale/Material/Material/Màterial                                                                                                                   |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| ■ | Acciaio 39NiCrMo3 Bonificato<br>Steel 39NiCrMo3 hardened and tempered<br>Vergüteter Stahl 39NiCrMo3<br>Acier bonifié 39NiCrMo3                         |
| □ | Acciaio 18NiCrMo5 Cementato e temprato<br>Steel 18NiCrMo5 Case hardened<br>Einsatzstahl 18NiCrMo5 Einsatzgehärtet<br>Acier cementé et trempé 18NiCrMo5 |

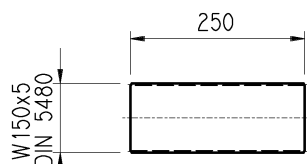
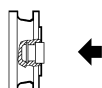
**Manicotti lisci / Sleeve couplings**  
**Naben / Manchons lisses a cannelure interieure**



**M0A**

Materiale : Acciaio 16CrNi4  
Material : Steel 16CrNi4  
Material : Stahl 16CrNi4  
Màterial : Acier 16CrNi4

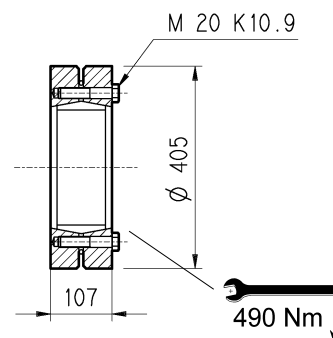
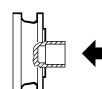
**Barre scanalate / Splined bars**  
**Vielkeilwellen / Barre cannelée**



**B0A**

Mat. acciaio 18NiCrMo5 UNI 5331 da cementare e temprare 50-55 HRC  
Case hardening steel 18NiCrMo5 UNI 5331  
must be case hardened 50-55 HRC  
Material: Einsatzstahl 18NiCrMo5 UNI 5331  
muss einsatzgehärtet werden 50-55 HRC  
Acier 18 NiCrMo5 UNI 5331 doit être cémenté trempé 50-55 HRC

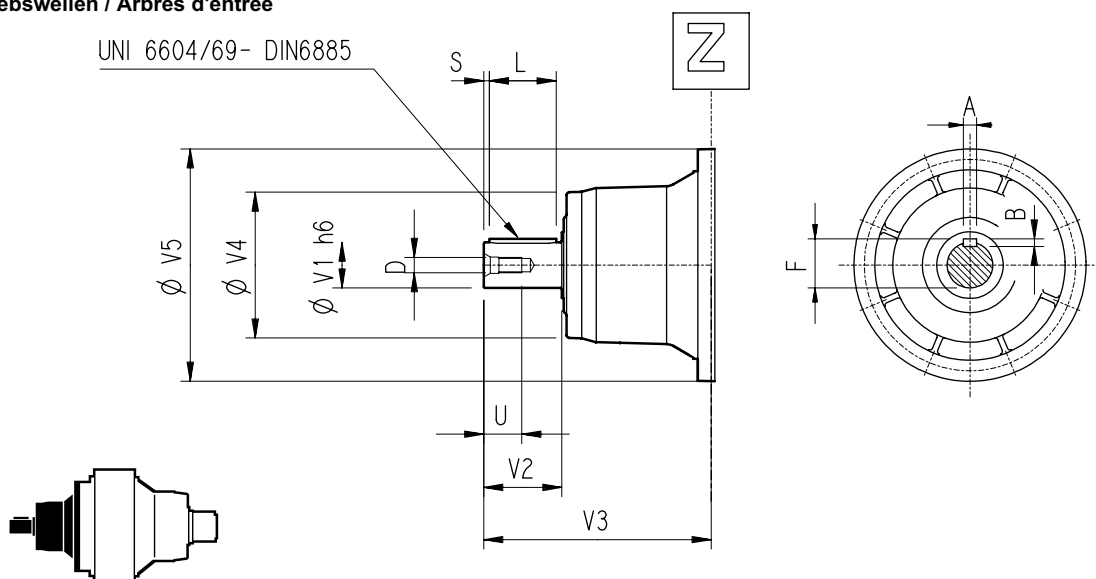
**Giunto ad attrito / Shrink disc**  
**Schrumpfscheibe / Frette de serrage**



**G0A**

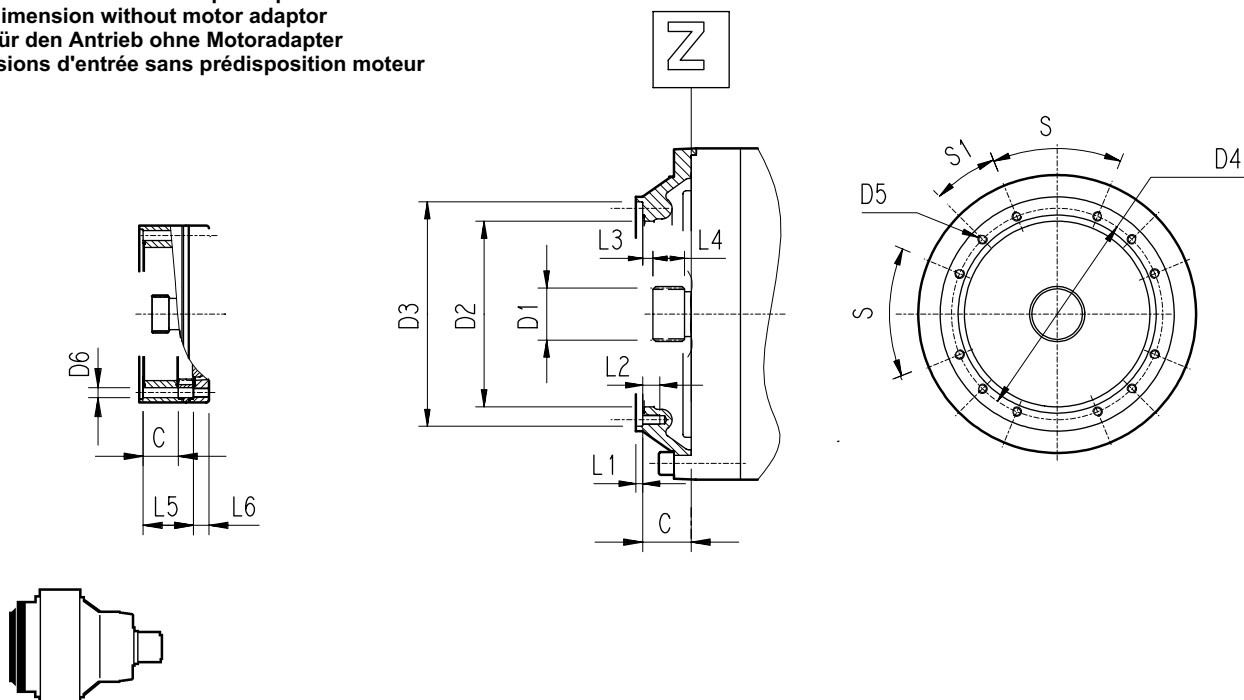
# 315L - 315R

Alberi veloci / Input shaft  
Antriebswellen / Arbres d'entrée



|                | CODE | V1 | V2  | V3  | V4  | V5  | A  | B  | F    | L   | S   | D   | U  |
|----------------|------|----|-----|-----|-----|-----|----|----|------|-----|-----|-----|----|
| 315 L2         | V11B | 80 | 130 | 348 | 200 | 428 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
| 315 L3         | V07B | 80 | 130 | 315 | 200 | 345 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
|                | V07A | 60 | 105 | 313 | 155 | 345 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |
| 315 L4         | V05B | 48 | 82  | 239 | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 315 R3 (A)-R4  | V05B | 48 | 82  | 239 | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 315 R3 (B) (C) | V06B | 60 | 105 | 307 | 155 | 292 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |

Dimensioni d'entrata senza predisposizione motore  
Input dimension without motor adaptor  
Maße für den Antrieb ohne Motoradapter  
Dimensions d'entrée sans prédisposition moteur



|                  | C   | D1              | D2  | D3     | D4  | D5       | D6 | L1 | L2 | L3  | L4 | L5 | L6 | S   | S1    | Entrata<br>Input<br>Antrieb<br>Entrée |
|------------------|-----|-----------------|-----|--------|-----|----------|----|----|----|-----|----|----|----|-----|-------|---------------------------------------|
| 315 L1           | 116 | 100x94 DIN 5482 | 340 | 412 H7 | 390 | M16 n°18 | /  | 7  | 30 | 8   | 55 | /  | /  | 20° | 20°   | E                                     |
| 315 L2           | 81  | 80x74 DIN 5482  | 270 | 335 H7 | 314 | M16 n°8  | /  | 5  | 30 | 8.5 | 40 | /  | /  | 60° | 30°   | D                                     |
| 315 L3           | 51  | 58x53 DIN 5482  | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11  | 22 | /  | /  | 45° | 22.5° | B                                     |
| 315 L4           | 37  | 40x36 DIN 5482  | 140 | 178 H7 | 165 | M10 n°8  | 0  | 4  | 18 | 9   | 18 | 0  | 0  | 45° | 45°   | A                                     |
| 315 R2-R3 (A)-R4 | 37  | 40x36 DIN 5482  | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | 18 | 9   | 18 | 0  | 0  | 45° | 45°   | A                                     |
| 315 R3 (B) (C)   | 45  | 58x53 DIN 5482  | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11  | 22 | /  | /  | 45° | 22.5° | B                                     |

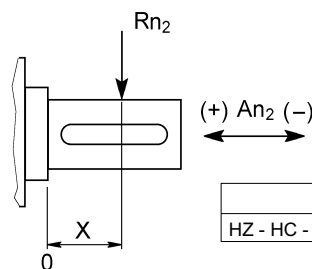
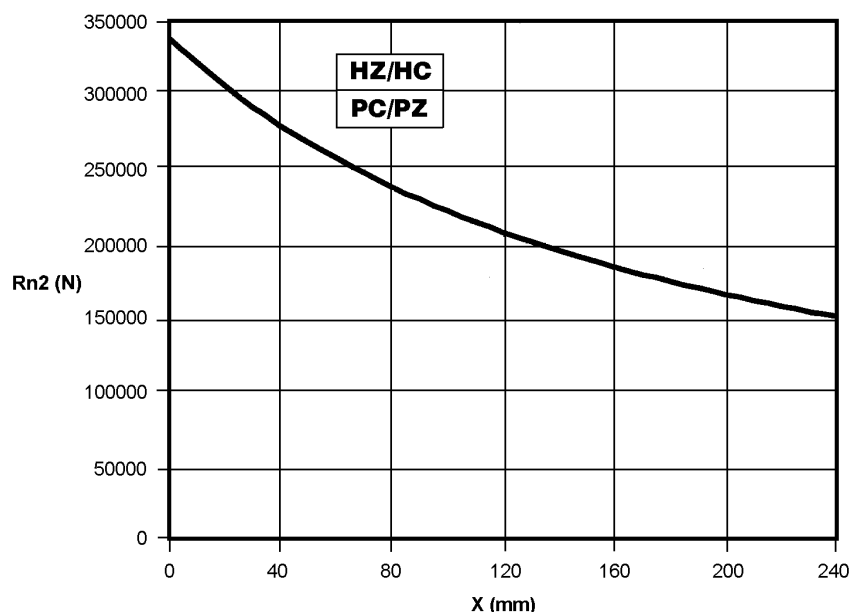
## 315L - 315R

Carichi radiali ed assiali ammissibili sull'albero lento per un valore di  $Fh_2 : n_2 \cdot h = 10\ 000$

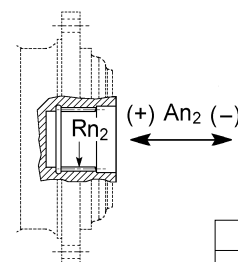
Permissible radial and axial loads on output shaft with  $Fh_2 : n_2 \cdot h = 10\ 000$

An der Ausgangswelle zulässige Radiallasten und Axialkräfte für einen Wert von  $Fh_2 : n_2 \cdot h = 10\ 000$

Charges radiales et axiales admises sur l'arbre lent pour une valeur de  $Fh_2 : n_2 \cdot h = 10\ 000$



|                   | $An_2 (+)$ | $An_2 (-)$ |
|-------------------|------------|------------|
| HZ - HC - PC - PZ | 280 000    | 210 000    |



|    | $Rn_2$ | $An_2 (+/-)$ |
|----|--------|--------------|
| FZ | 90 000 | 90 000       |

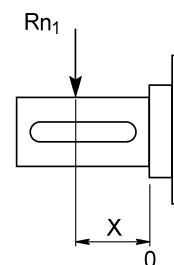
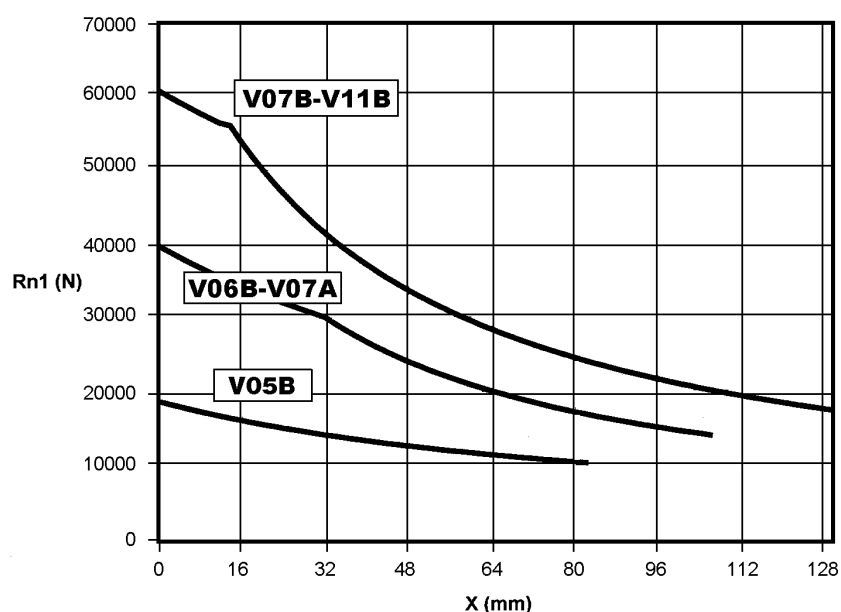
| Fattore $fh_2$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_2$ on shafts<br>Korrektionsfaktor $fh_2$ für wellenbelastungen<br>Facteur de correction $fh_2$ pour charges sur les arbres | $Fh_2 = n_2 \cdot h$ |                   | 10 000 | 25 000 | 50 000 | 100 000 | 500 000 | 1 000 000 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|--------|--------|--------|---------|---------|-----------|
|                                                                                                                                                                                                             | $fh_2$               | FZ                | 1      | 0.74   | 0.58   | 0.46    | 0.27    | 0.21      |
|                                                                                                                                                                                                             |                      | HZ - HC - PC - PZ | 1      | 0.76   | 0.61   | 0.50    | 0.31    | 0.25      |

Carichi radiali ammissibili sull'albero veloce per un valore di  $Fh_1 : n_1 \cdot h = 250\ 000$

Permissible radial loads on input shaft with  $Fh_1 : n_1 \cdot h = 250\ 000$

An der Antriebswelle zulässige Radiallasten für einen Wert von  $Fh_1 : n_1 \cdot h = 250\ 000$

Charges radiales admises sur l'arbre d'entrée pour une valeur de  $Fh_1 : n_1 \cdot h = 250\ 000$



| Fattore $fh_1$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_1$ on shafts<br>Korrektionsfaktor $fh_1$ für wellenbelastungen<br>Facteur de correction $fh_1$ pour charges sur les arbres | $Fh_1 = n_1 \cdot h$ | 250 000 | 500 000 | 1 000 000 | 2 000 000 | 5 000 000 | 10 000 000 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|---------|-----------|-----------|-----------|------------|
|                                                                                                                                                                                                             | $fh_1$               | 1       | 0.79    | 0.63      | 0.50      | 0.37      | 0.29       |

# 316L

**M<sub>2</sub> = 105000 Nm**

|  | i     | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|-----------------------------------------------------------------------------------|-------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                   |       | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h |                |                |                      |                      |                |                                                                                     |
|                                                                                   | 1:    | 10 000               | 25 000            | 50 000            | 100 000           | 500 000           | 1 000 000         | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>L1</b>                                                                         | 4.40  | 135 000              | 126 000           | 113 000           | 100 000           | 66 000            | 54 000            | 280            | 68             | 350                  | 500                  |                |                                                                                     |
| <b>L2</b>                                                                         | 18.0  | 135 000              | 126 000           | 103 000           | 84 000            | 52 000            | 42 000            | 180            | 50             | 750                  | 1 000                |                |                                                                                     |
|                                                                                   | 23.1  | 135 000              | 126 000           | 107 000           | 85 000            | 53 000            | 42 700            | 180            | 50             | 750                  | 1 000                |                |                                                                                     |
|                                                                                   | 27.4  | 124 000              | 115 000           | 98 000            | 79 600            | 49 400            | 40 500            | 180            | 50             | 750                  | 1 000                |                |                                                                                     |
| <b>L3</b>                                                                         | 61.7  | 135 000              | 126 000           | 103 000           | 84 000            | 52 000            | 42 000            | 100            | 35             | 1 500                | 2 500                | 3 200          | 6L                                                                                  |
|                                                                                   | 73.6  | 135 000              | 126 000           | 103 000           | 84 000            | 52 000            | 42 000            | 100            | 35             | 1 500                | 2 500                | 2 600          | 6K                                                                                  |
|                                                                                   | 79.2  | 135 000              | 126 000           | 107 000           | 85 000            | 53 000            | 42 700            | 100            | 35             | 1 500                | 2 500                | 2 600          | 6K                                                                                  |
|                                                                                   | 94.5  | 135 000              | 126 000           | 103 000           | 84 000            | 52 000            | 42 000            | 100            | 35             | 1 500                | 2 500                | 2 100          | 6G                                                                                  |
|                                                                                   | 112   | 132 000              | 121 000           | 103 000           | 84 000            | 52 000            | 42 000            | 100            | 35             | 1 500                | 2 500                | 2 100          | 6G                                                                                  |
|                                                                                   | 121   | 135 000              | 126 000           | 107 000           | 85 000            | 53 000            | 42 700            | 100            | 35             | 1 500                | 2 500                | 1 500          | 6E                                                                                  |
|                                                                                   | 144   | 132 000              | 121 000           | 103 000           | 84 000            | 52 000            | 42 000            | 100            | 35             | 1 500                | 2 500                | 1 500          | 6E                                                                                  |
|                                                                                   | 171   | 124 000              | 115 000           | 98 100            | 80 000            | 49 400            | 40 500            | 100            | 35             | 1 500                | 2 500                | 1 100          | 6C                                                                                  |
| <b>L4</b>                                                                         | 222   | 135 000              | 126 000           | 103 000           | 84 000            | 52 000            | 42 000            | 60             | 18             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                   | 265   | 135 000              | 126 000           | 103 000           | 84 000            | 52 000            | 42 000            | 60             | 18             | 1 800                | 3 800                | 800            | 5G                                                                                  |
|                                                                                   | 313   | 135 000              | 126 000           | 103 000           | 84 000            | 52 000            | 42 000            | 60             | 18             | 1 800                | 3 800                | 630            | 5E                                                                                  |
|                                                                                   | 340   | 135 000              | 126 000           | 103 000           | 84 000            | 52 000            | 42 000            | 60             | 18             | 1 800                | 3 800                | 630            | 5E                                                                                  |
|                                                                                   | 383   | 135 000              | 126 000           | 103 000           | 84 000            | 52 000            | 42 000            | 60             | 18             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                   | 457   | 135 000              | 126 000           | 103 000           | 84 000            | 52 000            | 42 000            | 60             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 504   | 135 000              | 126 000           | 103 000           | 84 000            | 52 000            | 42 000            | 54             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 552   | 135 000              | 126 000           | 103 000           | 84 000            | 52 000            | 42 000            | 50             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 586   | 135 000              | 126 000           | 103 000           | 84 000            | 52 000            | 42 000            | 47             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 612   | 132 000              | 121 000           | 103 000           | 84 000            | 52 000            | 42 000            | 45             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 647   | 135 000              | 126 000           | 107 000           | 85 000            | 53 000            | 42 700            | 42             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 709   | 135 000              | 126 000           | 103 000           | 84 000            | 52 000            | 42 000            | 39             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 752   | 135 000              | 126 000           | 107 000           | 85 000            | 53 000            | 42 700            | 37             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 768   | 132 000              | 121 000           | 103 000           | 84 000            | 52 000            | 42 000            | 36             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 841   | 132 000              | 121 000           | 103 000           | 84 000            | 52 000            | 42 000            | 33             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 892   | 132 000              | 121 000           | 103 000           | 84 000            | 52 000            | 42 000            | 31             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 1 079 | 132 000              | 121 000           | 103 000           | 84 000            | 52 000            | 42 000            | 25             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 1 281 | 124 000              | 115 000           | 98 100            | 80 000            | 49 400            | 40 500            | 21             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

**M<sub>2</sub> = 105000 Nm**

**316R**

|  | i    | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|----------------------------------------------------------------------------------|------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                  | 1:   | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>R3 (B)</b>                                                                    | 52.9 | 108 000              | 101 000           | 87 000            | 70 000            | 42 300            | 33 900            | 150            | 75             | 1 500                | 2 500                | 2 600          | 6K                                                                                  |
|                                                                                  | 67.9 | 134 000              | 126 000           | 104 000           | 82 000            | 50 000            | 40 200            | 150            | 75             | 1 500                | 2 500                | 2 600          | 6K                                                                                  |
|                                                                                  | 81.0 | 124 000              | 115 000           | 98 000            | 79 000            | 49 400            | 40 500            | 150            | 75             | 1 500                | 2 500                | 2 100          | 6G                                                                                  |
| <b>R3 (C)</b>                                                                    | 73.2 | 105 000              | 79 000            | 64 000            | 52 000            | 32 200            | 26 200            | 150            | 90             | 1 500                | 2 500                | 2 100          | 6G                                                                                  |
|                                                                                  | 93.9 | 126 000              | 95 000            | 78 000            | 61 000            | 39 100            | 31 500            | 150            | 90             | 1 500                | 2 500                | 2 100          | 6G                                                                                  |
|                                                                                  | 111  | 124 000              | 108 000           | 86 000            | 70 000            | 44 100            | 36 300            | 150            | 90             | 1 500                | 2 500                | 1 500          | 6E                                                                                  |
| <b>R4</b>                                                                        | 233  | 101 000              | 92 000            | 76 000            | 61 000            | 38 300            | 31 400            | 82             | 45             | 1 800                | 3 800                | 630            | 5E                                                                                  |
|                                                                                  | 278  | 117 000              | 104 000           | 84 000            | 69 000            | 43 000            | 34 500            | 79             | 45             | 1 800                | 3 800                | 630            | 5E                                                                                  |
|                                                                                  | 299  | 124 000              | 110 000           | 91 000            | 73 000            | 45 000            | 36 800            | 78             | 45             | 1 800                | 3 800                | 630            | 5E                                                                                  |
|                                                                                  | 357  | 135 000              | 125 000           | 102 000           | 83 000            | 51 000            | 41 800            | 71             | 45             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                  | 424  | 132 000              | 121 000           | 103 000           | 83 000            | 51 000            | 42 000            | 59             | 45             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                  | 458  | 135 000              | 126 000           | 107 000           | 85 000            | 53 000            | 42 700            | 56             | 45             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                  | 544  | 132 000              | 121 000           | 103 000           | 83 000            | 51 000            | 42 000            | 46             | 45             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                  | 645  | 124 000              | 115 000           | 98 000            | 79 000            | 49 400            | 40 500            | 36             | 45             | 1 800                | 3 800                | 400            | 5B                                                                                  |
| <b>M<sub>2max</sub> = 1.2 · M<sub>n2</sub> (n<sub>2</sub> · h = 10 000)</b>      |      |                      |                   |                   |                   |                   |                   |                |                |                      |                      |                |                                                                                     |

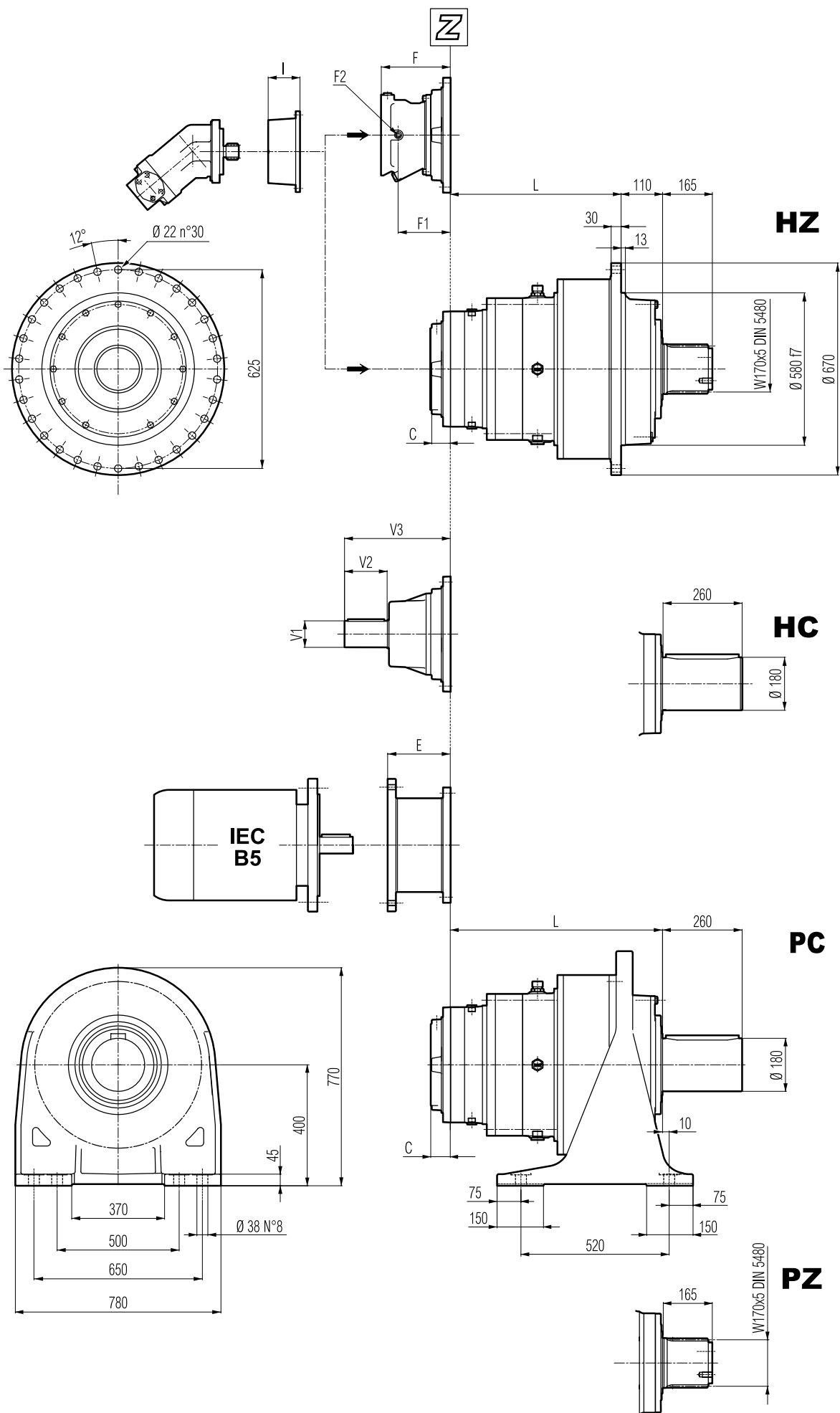
Nota: i contrassegni (A) (B) (C) sulla stessa grandezza, indicano riduzioni angolari di dimensioni differenti: vedere le pagine dimensionali.

Note: Letters (A) (B) (C) near size indication identify different angle reduction dimensions. See pages relevant to dimensions.

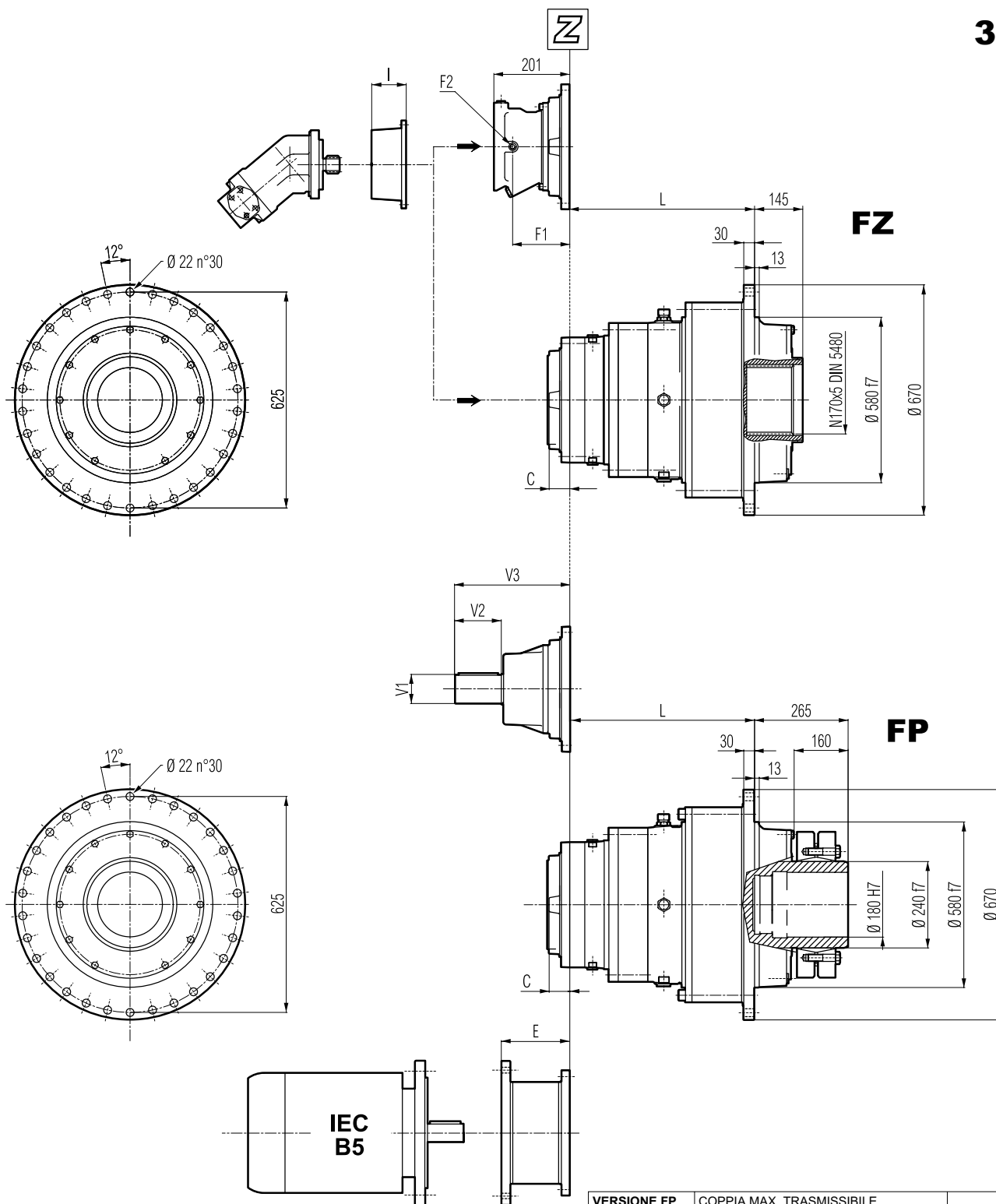
Hinweis: Die Kennzeichnungen (A) (B) (C) an der gleichen Baugröße weisen auf die Winkelreduzierung in unterschiedlichen Maßen hin: siehe Seiten mit Maßtabellen.

Remarque : les indications (A) (B) (C) sur la même taille indique des réductions angulaires de dimensions différentes. Se reporter aux pages des dimensions.

# 316L



# 316L

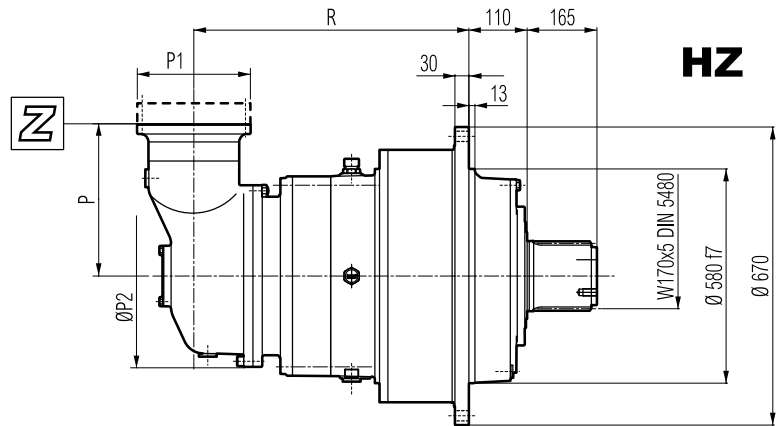
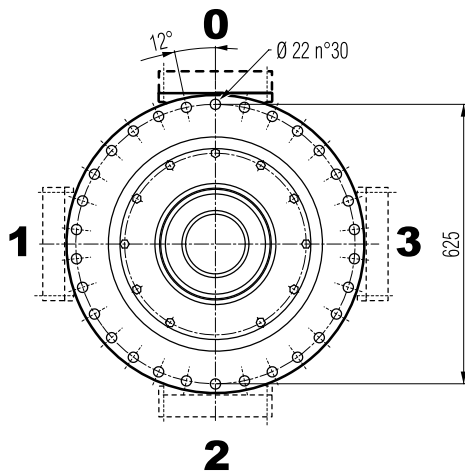
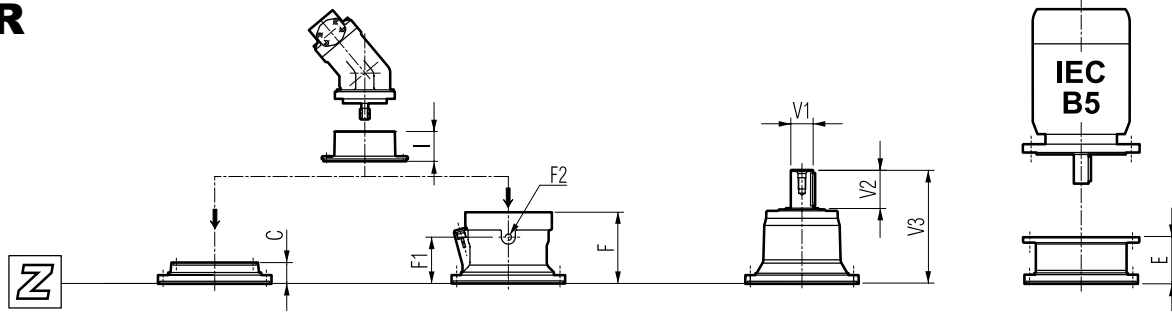


|             |                           |            |
|-------------|---------------------------|------------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 162 000 Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |            |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |            |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |            |

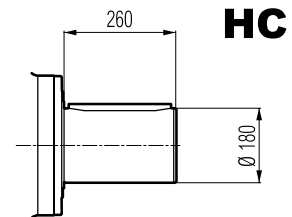
|        | L        |          |     |     |  |          |     |     |  |                                       |  |  |     |       |                             |                                       |                                                                                       |
|--------|----------|----------|-----|-----|-------------------------------------------------------------------------------------|----------|-----|-----|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-------|-----------------------------|---------------------------------------|---------------------------------------------------------------------------------------|
|        | HZ<br>HC | PC<br>PZ | FZ  | FP  | HZ<br>HC                                                                            | PC<br>PZ | FZ  | FP  | C                                                                                   | Entrata<br>Input<br>Antrieb<br>Entrée | I                                                                                     | F                                                                                     | F1  | F2    | Tipo<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |  |
| 316 L1 | 179      | 289      | 179 | 179 | 500                                                                                 | 700      | 430 | 450 | 156                                                                                 | E                                     |  |                                                                                       |     |       |                             |                                       |                                                                                       |
| 316 L2 | 431      | 541      | 431 | 431 | 590                                                                                 | 790      | 520 | 540 | 81                                                                                  | D                                     |                                                                                       |                                                                                       |     |       |                             |                                       |                                                                                       |
| 316 L3 | 564      | 674      | 564 | 564 | 640                                                                                 | 840      | 570 | 590 | 51                                                                                  | B                                     |                                                                                       | 201                                                                                   | 153 | 1/4 G | 6                           | B                                     | 28                                                                                    |
| 316 L4 | 653      | 763      | 653 | 653 | 660                                                                                 | 860      | 590 | 610 | 37                                                                                  | A                                     |                                                                                       | 191                                                                                   | 145 | 95    | 1/4 G                       | 5                                     | A                                                                                     |

|        | V1 | V2  | V3  | Kg | V1 | V2  | V3  | Kg | E       |         |         |         |         |         |     |  |
|--------|----|-----|-----|----|----|-----|-----|----|---------|---------|---------|---------|---------|---------|-----|--|
|        |    |     |     |    |    |     |     |    | IEC 132 | IEC 160 | IEC 180 | IEC 200 | IEC 225 | IEC 250 |     |  |
| 316 L1 |    |     |     |    |    |     |     |    |         |         |         |         |         |         |     |  |
| 316 L2 | 80 | 130 | 348 | 35 |    |     |     |    |         |         |         |         |         |         |     |  |
| 316 L3 | 80 | 130 | 315 | 35 | 60 | 105 | 313 | 28 |         |         |         | 195     | 186     | 216     | 215 |  |
| 316 L4 | 48 | 82  | 239 | 15 |    |     |     |    |         |         |         | 114     | 144     | 144     | 174 |  |

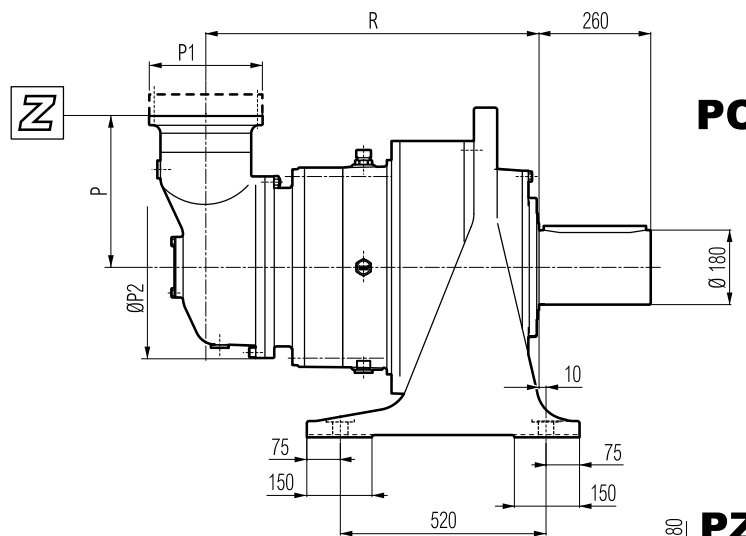
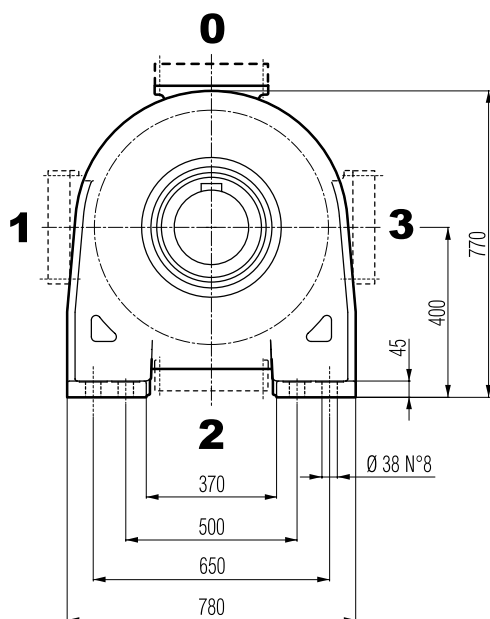
# 316R



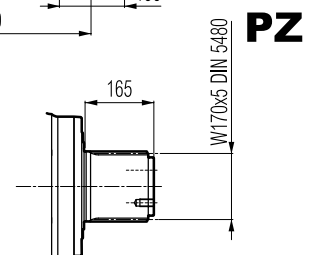
**HZ**



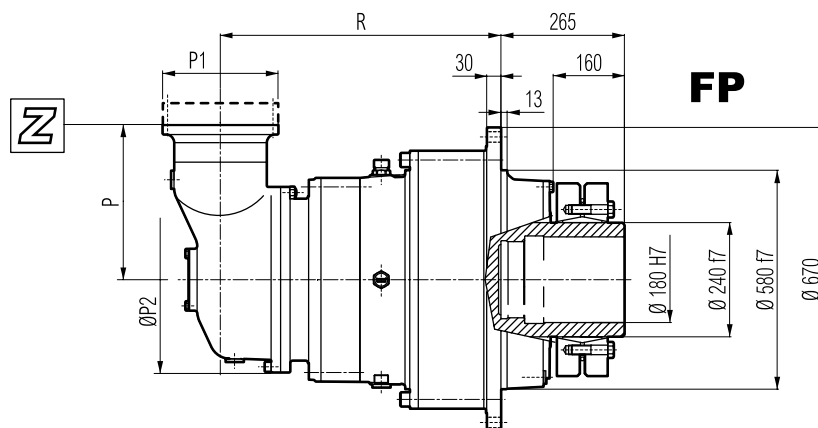
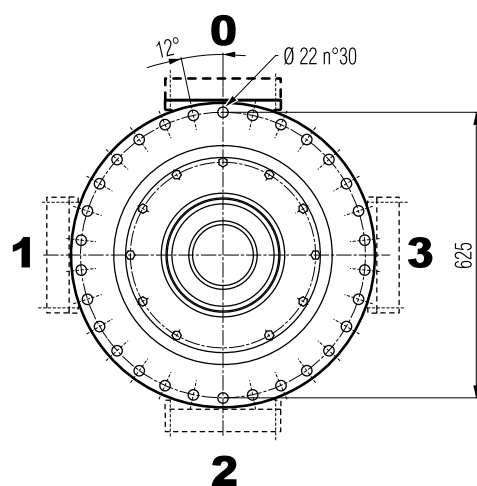
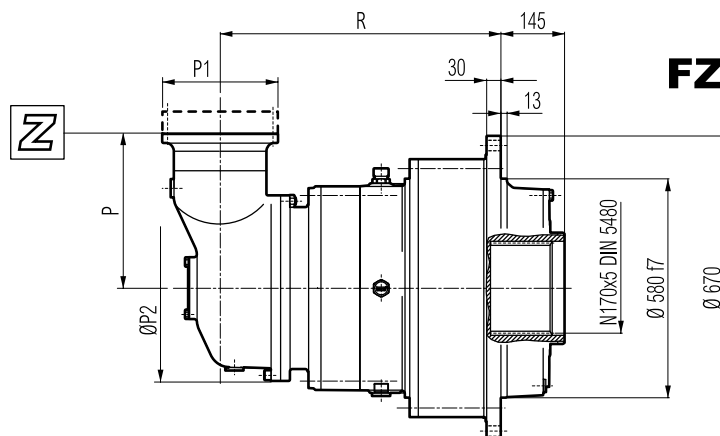
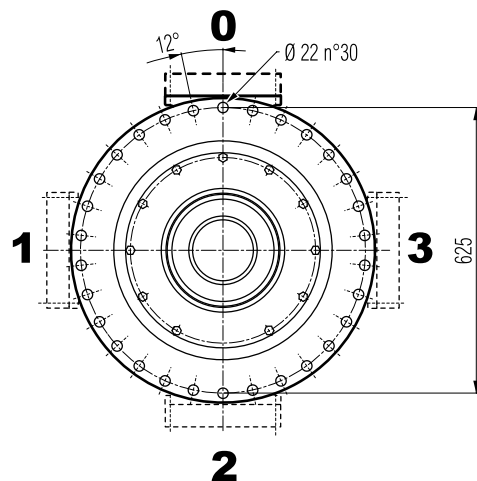
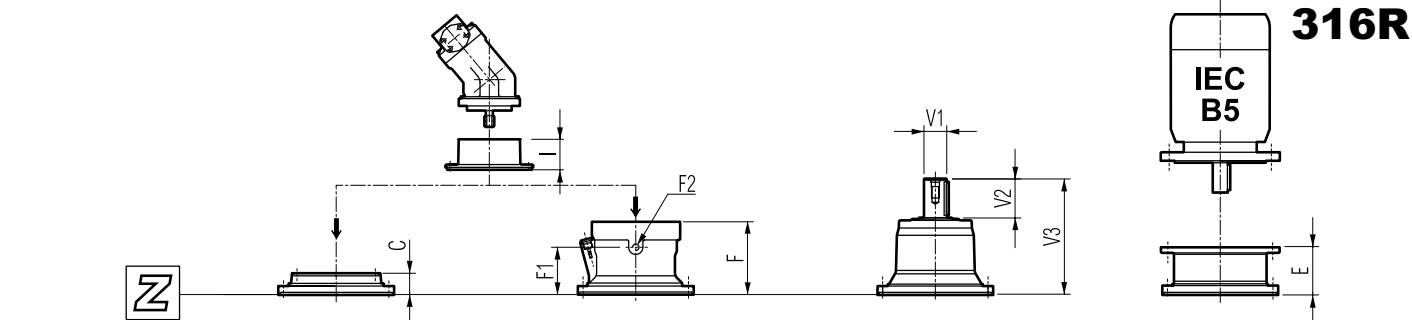
**HC**



**PC**



**PZ**

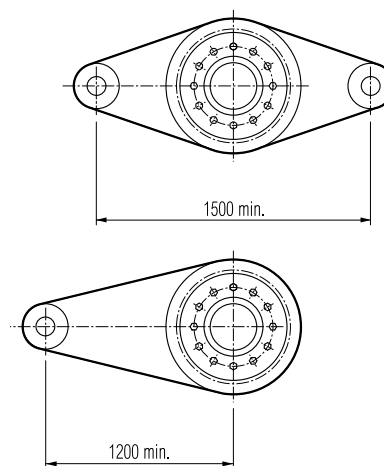
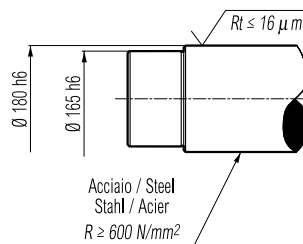
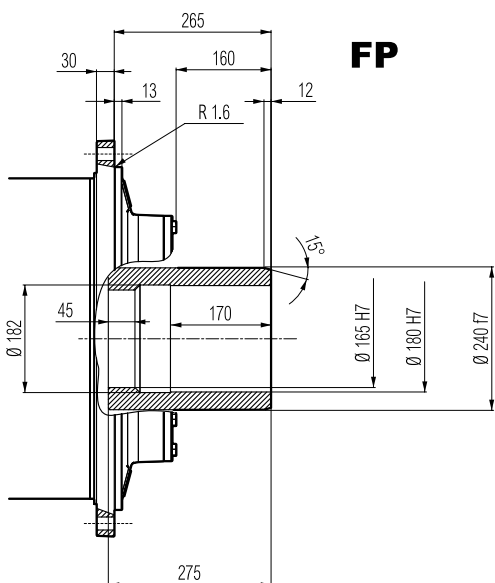
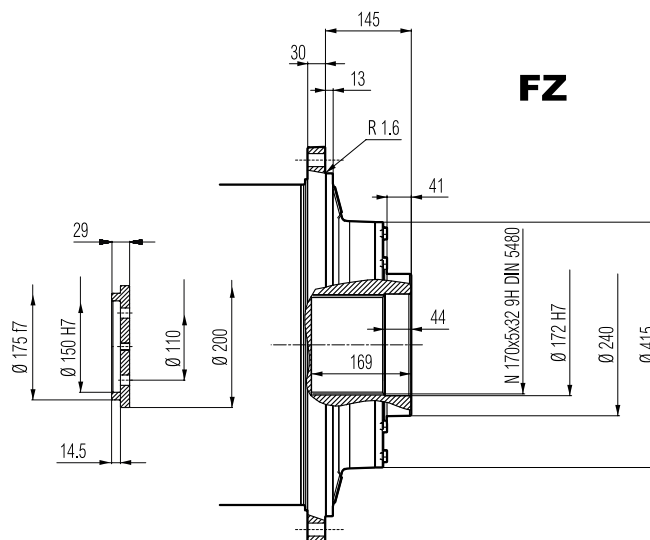
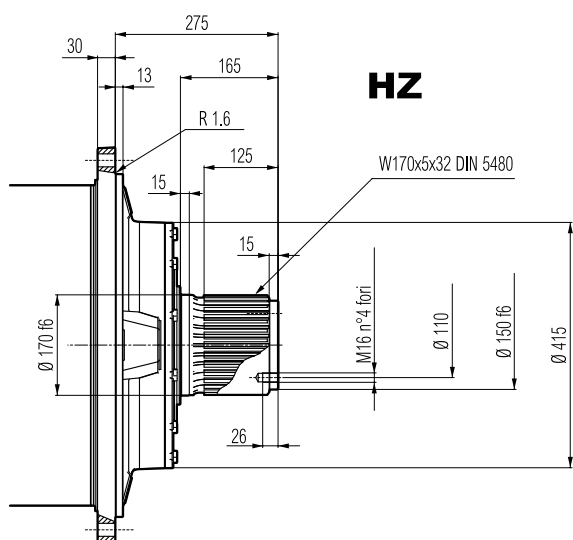
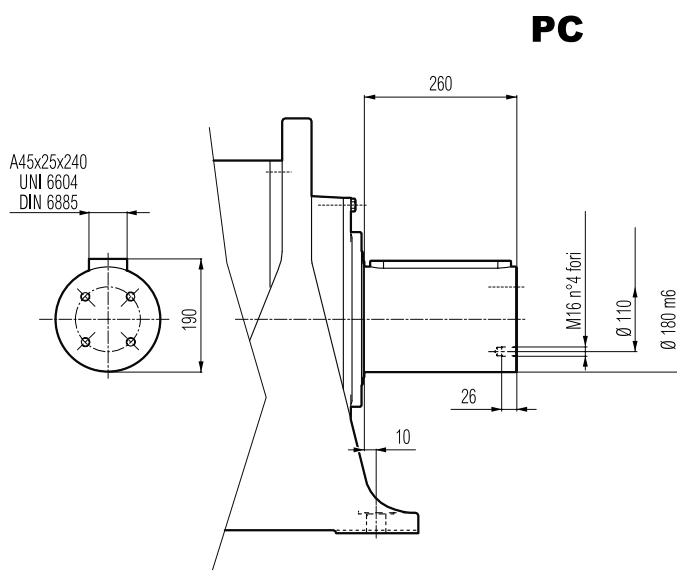
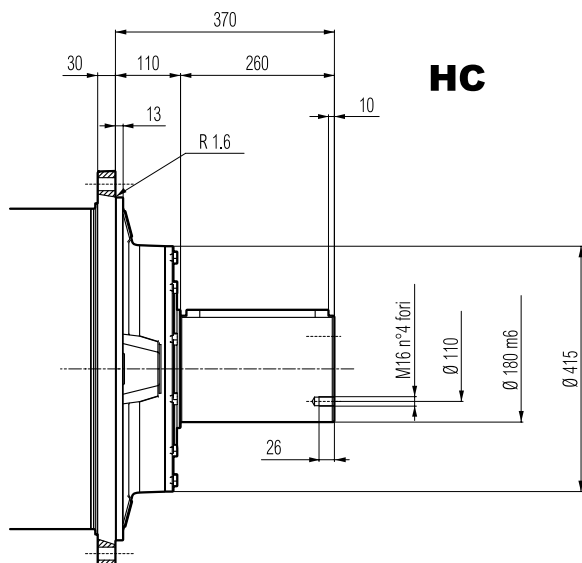


|             |                           |            |
|-------------|---------------------------|------------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 162 000 Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |            |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |            |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |            |

|            | R        |          |     |     | P   | P1  | P2  |  |          |     |     |  |                                       |  |  |     |       |                             |                                       |                                                                                       |
|------------|----------|----------|-----|-----|-----|-----|-----|-------------------------------------------------------------------------------------|----------|-----|-----|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-------|-----------------------------|---------------------------------------|---------------------------------------------------------------------------------------|
|            | HZ<br>HC | PC<br>PZ | FZ  | FP  |     |     |     | HZ<br>HC                                                                            | PC<br>PZ | FZ  | FP  | C                                                                                   | Entrata<br>Input<br>Antrieb<br>Entrée | I                                                                                     | F                                                                                     | F1  | F2    | Typo<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |  |
| 316 R3 (B) | 656      | 766      | 656 | 656 | 345 | 292 | 400 | 710                                                                                 | 910      | 640 | 660 | 45                                                                                  | B                                     |  | 195                                                                                   | 147 | 1/4 G | 6                           | B                                     | 28                                                                                    |
| 316 R3 (C) | 656      | 766      | 656 | 656 | 390 | 292 | 480 | 720                                                                                 | 920      | 650 | 670 | 45                                                                                  | B                                     |                                                                                       | 195                                                                                   | 147 | 1/4 G | 6                           | B                                     | 28                                                                                    |
| 316 R4     | 683      | 793      | 683 | 683 | 225 | 245 | 345 | 690                                                                                 | 890      | 620 | 640 | 37                                                                                  | A                                     |                                                                                       | 191                                                                                   | 145 | 95    | 1/4 G                       | 5                                     | A                                                                                     |

|            | V1 | V2  | V3  |  | V1 | V2 | V3 |  | E      |        |        |         |         |         |         |         |         |         |         |
|------------|----|-----|-----|-------------------------------------------------------------------------------------|----|----|----|-------------------------------------------------------------------------------------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
|            |    |     |     |                                                                                     |    |    |    |                                                                                     | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 | IEC 200 | IEC 225 | IEC 250 |
| 316 R3 (B) | 60 | 105 | 307 | 23                                                                                  |    |    |    |                                                                                     |        |        |        |         |         |         |         | 152     | 182     | 212     | 193     |
| 316 R3 (C) | 60 | 105 | 307 | 23                                                                                  |    |    |    |                                                                                     |        |        |        |         |         |         |         | 152     | 182     | 212     | 193     |
| 316 R4     | 48 | 82  | 239 | 15                                                                                  |    |    |    |                                                                                     |        |        |        |         | 114     | 144     |         | 144     | 174     |         |         |

# 316L - 316R

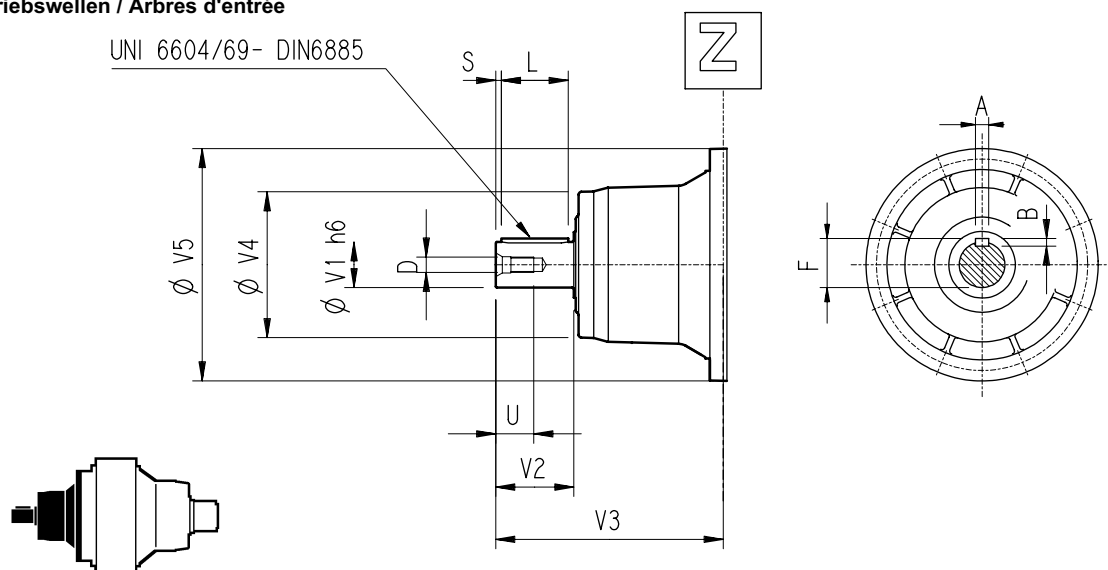


|             |                           |            |
|-------------|---------------------------|------------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 162 000 Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |            |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |            |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |            |



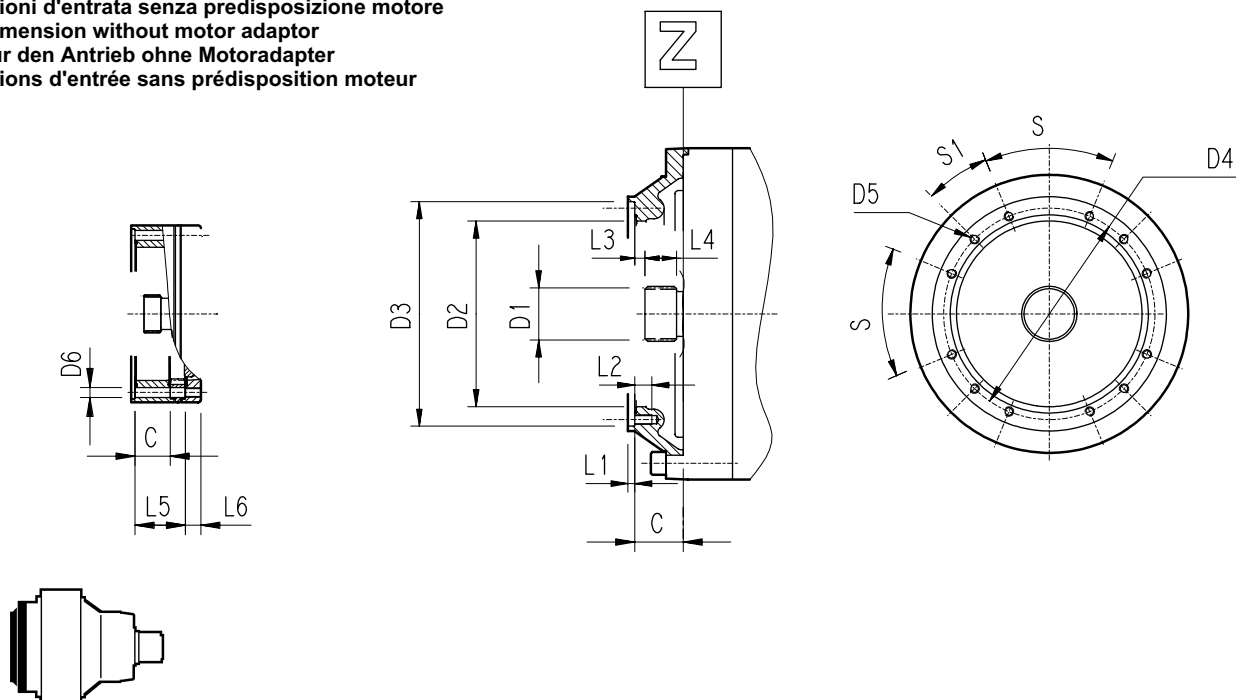
# 316L - 316R

Alberi veloci / Input shaft  
Antriebswellen / Arbres d'entrée



|                | CODE | V1 | V2  | V3  | V4  | V5  | A  | B  | F    | L   | S   | D   | U  |
|----------------|------|----|-----|-----|-----|-----|----|----|------|-----|-----|-----|----|
| 316 L2         | V11B | 80 | 130 | 348 | 200 | 428 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
| 316 L3         | V07B | 80 | 130 | 315 | 200 | 345 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
|                | V07A | 60 | 105 | 313 | 155 | 345 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |
| 316 L4         | V05B | 48 | 82  | 239 | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 316 R3 (B) (C) | V06B | 60 | 105 | 307 | 155 | 292 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |
| 316 R4         | V05B | 48 | 82  | 239 | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |

Dimensioni d'entrata senza predisposizione motore  
Input dimension without motor adaptor  
Maße für den Antrieb ohne Motoradapter  
Dimensions d'entrée sans prédisposition moteur



|                | C   | D1              | D2  | D3     | D4  | D5        | D6 | L1 | L2 | L3  | L4 | L5 | L6 | S   | S1    | Entrata<br>Input<br>Antrieb<br>Entrée |
|----------------|-----|-----------------|-----|--------|-----|-----------|----|----|----|-----|----|----|----|-----|-------|---------------------------------------|
| 316 L1         | 116 | 100x94 DIN 5482 | 340 | 412 H7 | 390 | M16 n° 18 | /  | 7  | 30 | 8   | 55 | /  | /  | 20° | 20°   | E                                     |
| 316 L2         | 81  | 80x74 DIN 5482  | 270 | 335 H7 | 314 | M16 n° 8  | /  | 5  | 30 | 8.5 | 40 | /  | /  | 60° | 30°   | D                                     |
| 316 L3         | 51  | 58x53 DIN 5482  | 195 | 236 H7 | 222 | M10 n° 12 | /  | 4  | 18 | 11  | 22 | /  | /  | 45° | 22.5° | B                                     |
| 316 L4         | 37  | 40x36 DIN 5482  | 140 | 178 H7 | 165 | M10 n° 8  | 0  | 4  | 18 | 9   | 18 | 0  | 0  | 45° | 45°   | A                                     |
| 316 R3 (B) (C) | 45  | 58x53 DIN 5482  | 195 | 236 H7 | 222 | M10° 12   | /  | 4  | 18 | 11  | 22 | /  | /  | 45° | 22.5° | B                                     |
| 316 R4         | 37  | 40x36 DIN 5482  | 140 | 178 H7 | 165 | M10 n° 8  | 11 | 4  | 18 | 9   | 18 | 0  | 0  | 45° | 45°   | A                                     |

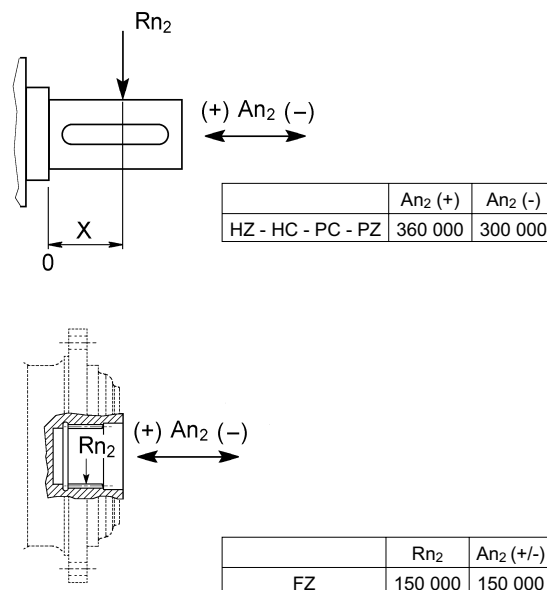
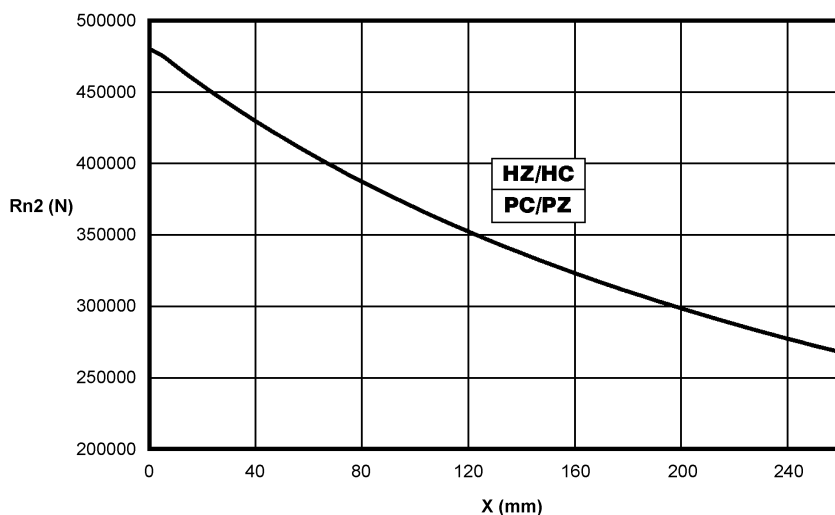
## 316L - 316R

Carichi radiali ed assiali ammissibili sull'albero lento per un valore di  $Fh_2 : n_2 \cdot h = 10\,000$

Permissible radial and axial loads on output shaft with  $Fh_2$   
 $n_2 \cdot h = 10\,000$

An der Ausgangswelle zulässige Radiallasten und Axialkräfte für einen Wert von  $Fh_2$   
 $n_2 \cdot h = 10\,000$

Charges radiales et axiales admises sur l'arbre lent pour une valeur de  $Fh_2 : n_2 \cdot h = 10\,000$



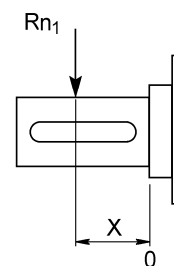
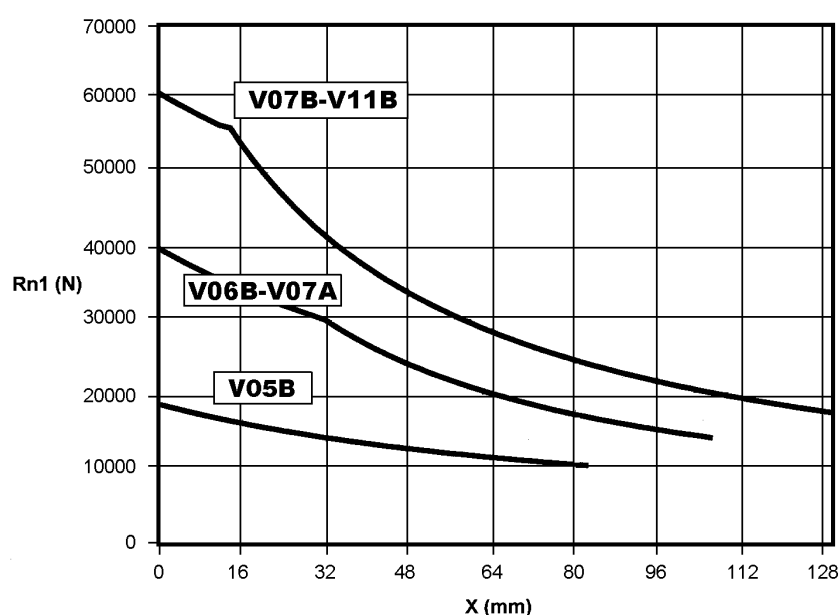
|                                                                                                                                                                                                                                                 |                                      |                   |        |        |        |         |         |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------|--------|--------|--------|---------|---------|-----------|
| Fattore fh <sub>2</sub> correttivo per carichi sugli alberi<br>Load corrective factor fh <sub>2</sub> on shafts<br>Korrektionsfaktor fh <sub>2</sub> für wellenbelastungen<br>Facteur de correction fh <sub>2</sub> pour charges sur les arbres | Fh <sub>2</sub> = n <sub>2</sub> · h |                   | 10 000 | 25 000 | 50 000 | 100 000 | 500 000 | 1 000 000 |
|                                                                                                                                                                                                                                                 | fh <sub>2</sub>                      | FZ                | 1      | 0.74   | 0.58   | 0.46    | 0.27    | 0.21      |
|                                                                                                                                                                                                                                                 |                                      | HZ - HC - PC - PZ | 1      | 0.76   | 0.61   | 0.50    | 0.31    | 0.25      |

Carichi radiali ammissibili sull'albero veloce per un valore di  $Fh_1$   
 $n_1 \cdot h = 250\,000$

Permissible radial loads on input shaft with  $Fh_1 : n_1 \cdot h = 250\,000$

An der Antriebswelle zulässige Radiallasten für einen Wert von  $Fh_1 : n_1 \cdot h = 250\,000$

Charges radiales admises sur l'arbre d'entrée pour une valeur de  $Fh_1 : n_1 \cdot h = 250\,000$



| Fattore fh1 correttivo per carichi sugli alberi<br>Load corrective factor fh1 on shafts<br>Korrektionsfaktor fh1 für wellenbelastungen<br>Facteur de correction fh1 pour charges sur les arbres | Fh1 = n1 · h |         |         |           |           |           |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------|---------|-----------|-----------|-----------|------------|
|                                                                                                                                                                                                 | fh1          | 250 000 | 500 000 | 1 000 000 | 2 000 000 | 5 000 000 | 10 000 000 |
|                                                                                                                                                                                                 |              | 1       | 0.79    | 0.63      | 0.50      | 0.37      | 0.29       |

# 317L

**M<sub>2</sub> = 150000 Nm**

|  | i     | M <sub>n2</sub> [Nm]        |                             |                             |                              |                              |                                | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|-----------------------------------------------------------------------------------|-------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                   | 1:    | n <sub>2</sub> ·h<br>10 000 | n <sub>2</sub> ·h<br>25 000 | n <sub>2</sub> ·h<br>50 000 | n <sub>2</sub> ·h<br>100 000 | n <sub>2</sub> ·h<br>500 000 | n <sub>2</sub> ·h<br>1 000 000 | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>L1</b>                                                                         | 4.09  | 180 000                     | 180 000                     | 166 000                     | 135 000                      | 83 000                       | 67 000                         | 300            | 85             | 200                  | 300                  |                |                                                                                     |
|                                                                                   | 5.25  | 170 000                     | 153 000                     | 141 000                     | 130 000                      | 80 000                       | 65 000                         | 300            | 85             | 200                  | 300                  |                |                                                                                     |
|                                                                                   | 6.23  | 145 000                     | 126 000                     | 115 000                     | 115 000                      | 78 000                       | 64 000                         | 300            | 85             | 200                  | 300                  |                |                                                                                     |
| <b>L2</b>                                                                         | 16.9  | 180 000                     | 180 000                     | 147 000                     | 120 000                      | 74 000                       | 60 000                         | 200            | 55             | 500                  | 800                  |                |                                                                                     |
|                                                                                   | 22.1  | 179 000                     | 177 000                     | 144 000                     | 117 000                      | 72 000                       | 59 000                         | 200            | 55             | 500                  | 800                  |                |                                                                                     |
|                                                                                   | 26.6  | 155 000                     | 155 000                     | 144 000                     | 117 000                      | 72 000                       | 59 000                         | 200            | 55             | 500                  | 800                  |                |                                                                                     |
|                                                                                   | 28.4  | 170 000                     | 153 000                     | 141 000                     | 130 000                      | 80 000                       | 65 000                         | 200            | 55             | 500                  | 800                  |                |                                                                                     |
|                                                                                   | 34.1  | 170 000                     | 153 000                     | 141 000                     | 130 000                      | 80 000                       | 65 000                         | 200            | 55             | 500                  | 800                  |                |                                                                                     |
|                                                                                   | 40.5  | 145 000                     | 126 000                     | 115 000                     | 115 000                      | 78 000                       | 64 000                         | 200            | 55             | 500                  | 800                  |                |                                                                                     |
| <b>L3</b>                                                                         | 58.1  | 180 000                     | 180 000                     | 147 000                     | 120 000                      | 74 000                       | 60 000                         | 130            | 35             | 1 400                | 2 000                | 3 200          | 6L                                                                                  |
|                                                                                   | 69.3  | 180 000                     | 174 000                     | 141 000                     | 115 000                      | 71 000                       | 58 000                         | 130            | 35             | 1 400                | 2 000                | 3 200          | 6L                                                                                  |
|                                                                                   | 89.0  | 180 000                     | 179 000                     | 145 000                     | 118 000                      | 73 000                       | 59 000                         | 130            | 35             | 1 400                | 2 000                | 2 600          | 6K                                                                                  |
|                                                                                   | 106   | 180 000                     | 174 000                     | 142 000                     | 115 000                      | 71 000                       | 58 000                         | 130            | 35             | 1 400                | 2 000                | 2 100          | 6G                                                                                  |
|                                                                                   | 116   | 179 000                     | 177 000                     | 144 000                     | 117 000                      | 72 000                       | 59 000                         | 130            | 35             | 1 400                | 2 000                | 1 500          | 6E                                                                                  |
|                                                                                   | 138   | 179 000                     | 177 000                     | 144 000                     | 117 000                      | 72 000                       | 59 000                         | 130            | 35             | 1 400                | 2 000                | 1 500          | 6E                                                                                  |
|                                                                                   | 166   | 155 000                     | 155 000                     | 144 000                     | 117 000                      | 72 000                       | 59 000                         | 130            | 35             | 1 400                | 2 000                | 1 100          | 6C                                                                                  |
|                                                                                   | 179   | 170 000                     | 153 000                     | 141 000                     | 130 000                      | 80 000                       | 65 000                         | 130            | 35             | 1 400                | 2 000                | 1 100          | 6C                                                                                  |
|                                                                                   | 213   | 170 000                     | 153 000                     | 141 000                     | 130 000                      | 80 000                       | 65 000                         | 130            | 35             | 1 400                | 2 000                | 850            | 6B                                                                                  |
|                                                                                   | 252   | 145 000                     | 126 000                     | 115 000                     | 115 000                      | 78 000                       | 63 800                         | 115            | 35             | 1 400                | 2 000                | 850            | 6B                                                                                  |
|                                                                                   |       |                             |                             |                             |                              |                              |                                |                |                |                      |                      |                |                                                                                     |
| <b>L4</b>                                                                         | 310   | 180 000                     | 139 000                     | 113 000                     | 92 000                       | 57 000                       | 46 000                         | 60             | 18             | 1 800                | 3 800                | 630            | 5E                                                                                  |
|                                                                                   | 360   | 180 000                     | 137 000                     | 112 000                     | 90 000                       | 56 000                       | 45 000                         | 60             | 18             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                   | 449   | 180 000                     | 175 000                     | 142 000                     | 115 000                      | 71 000                       | 58 000                         | 60             | 18             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                   | 493   | 179 000                     | 177 000                     | 144 000                     | 117 000                      | 72 000                       | 59 000                         | 60             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 552   | 180 000                     | 179 000                     | 145 000                     | 118 000                      | 73 000                       | 59 000                         | 60             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 619   | 179 000                     | 177 000                     | 144 000                     | 117 000                      | 72 000                       | 59 000                         | 60             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 719   | 179 000                     | 177 000                     | 144 000                     | 117 000                      | 72 000                       | 59 000                         | 59             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 792   | 180 000                     | 175 000                     | 142 000                     | 115 000                      | 71 000                       | 58 000                         | 54             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 904   | 170 000                     | 153 000                     | 141 000                     | 130 000                      | 80 000                       | 65 000                         | 47             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 1 032 | 179 000                     | 177 000                     | 144 000                     | 117 000                      | 72 000                       | 59 000                         | 41             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 1 134 | 170 000                     | 153 000                     | 141 000                     | 130 000                      | 80 000                       | 65 000                         | 38             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 1 318 | 170 000                     | 153 000                     | 141 000                     | 130 000                      | 80 000                       | 65 000                         | 32             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 1 595 | 170 000                     | 153 000                     | 141 000                     | 130 000                      | 80 000                       | 65 000                         | 27             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   | 1 893 | 145 000                     | 126 000                     | 115 000                     | 115 000                      | 78 000                       | 64 000                         | 22             | 18             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                   |       |                             |                             |                             |                              |                              |                                |                |                |                      |                      |                |                                                                                     |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

**M<sub>2</sub> = 150000 Nm**

**317R**

|  | i    | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|----------------------------------------------------------------------------------|------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                  |      | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h |                |                |                      |                      |                |                                                                                     |
|                                                                                  | 1:   | 10 000               | 25 000            | 50 000            | 100 000           | 500 000           | 1 000 000         | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>R3 (A)</b>                                                                    | 73.4 | 57 000               | 57 000            | 50 000            | 41 000            | 25 300            | 20 500            | 90             | 90             | 1 400                | 2 000                | 1 000          | 5K                                                                                  |
|                                                                                  | 95.7 | 75 000               | 75 000            | 61 000            | 49 300            | 30 400            | 24 700            | 90             | 90             | 1 400                | 2 000                | 1 000          | 5K                                                                                  |
|                                                                                  | 115  | 90 000               | 85 000            | 69 000            | 56 000            | 34 600            | 28 100            | 90             | 90             | 1 400                | 2 000                | 1 000          | 5K                                                                                  |
|                                                                                  | 123  | 96 000               | 89 000            | 72 000            | 48 700            | 30 000            | 24 400            | 90             | 90             | 1 400                | 2 000                | 1 000          | 5K                                                                                  |
|                                                                                  | 148  | 116 000              | 101 000           | 82 000            | 48 700            | 30 000            | 24 400            | 90             | 90             | 1 400                | 2 000                | 1 000          | 5K                                                                                  |
|                                                                                  | 176  | 137 000              | 114 000           | 93 000            | 75 000            | 46 500            | 37 800            | 90             | 90             | 1 400                | 2 000                | 1 000          | 5K                                                                                  |
| <b>R3 (B)</b>                                                                    | 78.2 | 151 000              | 138 000           | 115 000           | 92 000            | 55 000            | 45 000            | 150            | 90             | 1 400                | 2 000                | 2 600          | 6K                                                                                  |
|                                                                                  | 83.3 | 160 000              | 148 000           | 120 000           | 96 000            | 58 000            | 46 700            | 150            | 90             | 1 400                | 2 000                | 2 600          | 6K                                                                                  |
|                                                                                  | 100  | 170 000              | 153 000           | 134 000           | 109 000           | 65 000            | 53 000            | 150            | 90             | 1 400                | 2 000                | 2 100          | 6G                                                                                  |
|                                                                                  | 119  | 145 000              | 126 000           | 115 000           | 115 000           | 74 000            | 59 000            | 150            | 90             | 1 400                | 2 000                | 1 500          | 6E                                                                                  |
| <b>R3 (C)</b>                                                                    | 108  | 137 000              | 109 000           | 87 000            | 71 000            | 44 500            | 36 500            | 150            | 100            | 1 400                | 2 000                | 2 100          | 6G                                                                                  |
|                                                                                  | 116  | 145 000              | 109 000           | 89 000            | 72 000            | 45 300            | 36 000            | 150            | 100            | 1 400                | 2 000                | 2 100          | 6G                                                                                  |
|                                                                                  | 139  | 167 000              | 125 000           | 101 000           | 83 000            | 51 000            | 41 700            | 150            | 100            | 1 400                | 2 000                | 1 500          | 6E                                                                                  |
|                                                                                  | 165  | 145 000              | 126 000           | 114 000           | 93 000            | 57 000            | 47 600            | 142            | 100            | 1 400                | 2 000                | 1 100          | 6C                                                                                  |
| <b>R4</b>                                                                        | 220  | 99 000               | 88 000            | 71 000            | 58 000            | 35 800            | 29 100            | 90             | 50             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                  | 262  | 115 000              | 100 000           | 81 000            | 66 000            | 40 500            | 32 900            | 90             | 50             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                  | 336  | 145 000              | 119 000           | 96 000            | 78 000            | 48 300            | 39 200            | 90             | 50             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                  | 399  | 172 000              | 134 000           | 109 000           | 88 000            | 54 000            | 44 200            | 90             | 50             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                  | 438  | 179 000              | 143 000           | 116 000           | 94 000            | 58 000            | 47 200            | 90             | 50             | 1 800                | 3 800                | 500            | 5C                                                                                  |
|                                                                                  | 520  | 179 000              | 161 000           | 131 000           | 106 000           | 66 000            | 53 000            | 82             | 50             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                  | 626  | 155 000              | 155 000           | 144 000           | 117 000           | 72 000            | 59 000            | 68             | 50             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                  | 677  | 170 000              | 153 000           | 141 000           | 48 700            | 30 000            | 24 400            | 63             | 50             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                  | 803  | 170 000              | 153 000           | 141 000           | 48 700            | 30 000            | 24 400            | 53             | 50             | 1 800                | 3 800                | 400            | 5B                                                                                  |
|                                                                                  | 953  | 145 000              | 126 000           | 115 000           | 115 000           | 78 000            | 64 000            | 45             | 50             | 1 800                | 3 800                | 400            | 5B                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

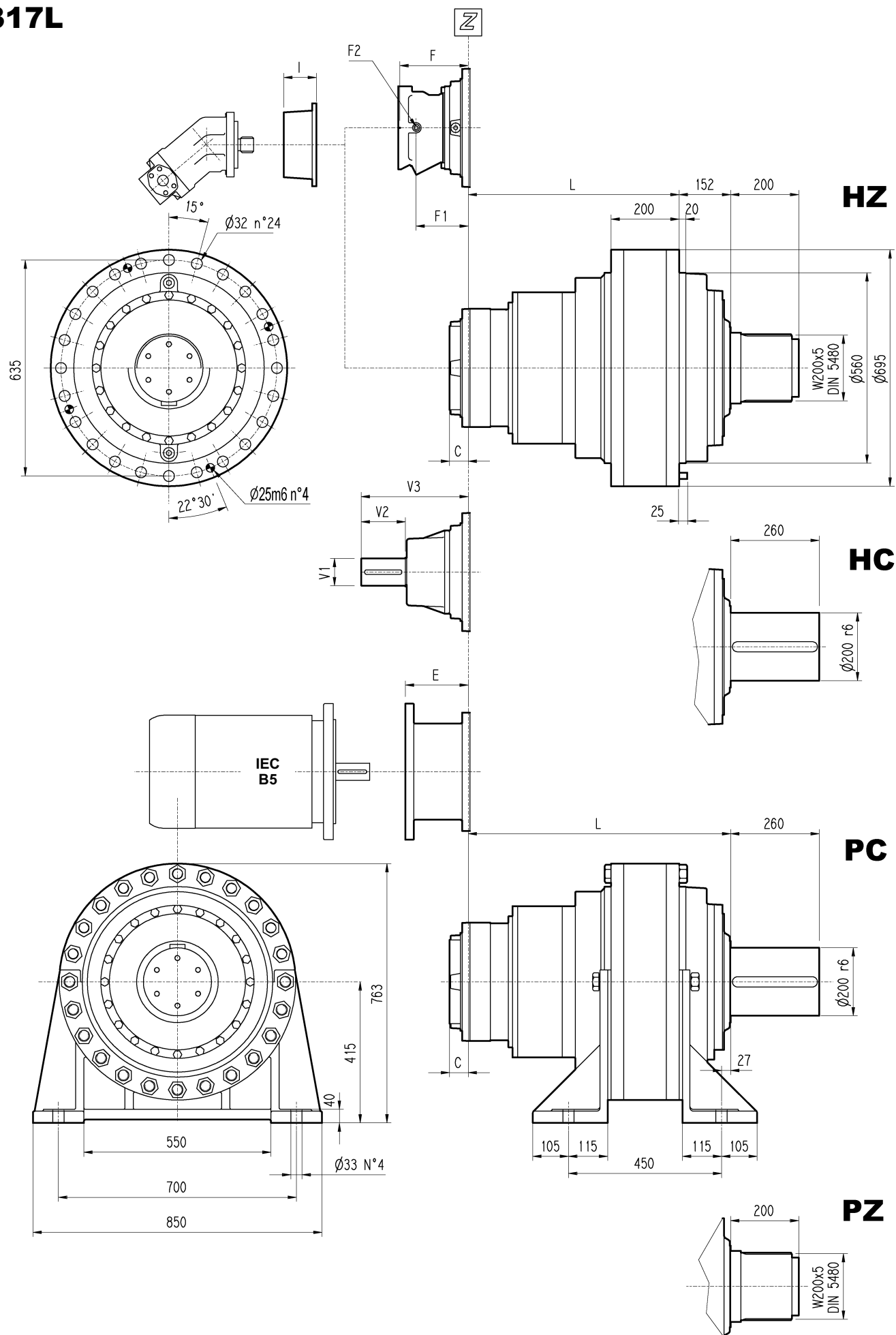
Nota: i contrassegni (A) (B) (C) sulla stessa grandezza, indicano riduzioni angolari di dimensioni differenti: vedere le pagine dimensionali.

Note: Letters (A) (B) (C) near size indication identify different angle reduction dimensions. See pages relevant to dimensions.

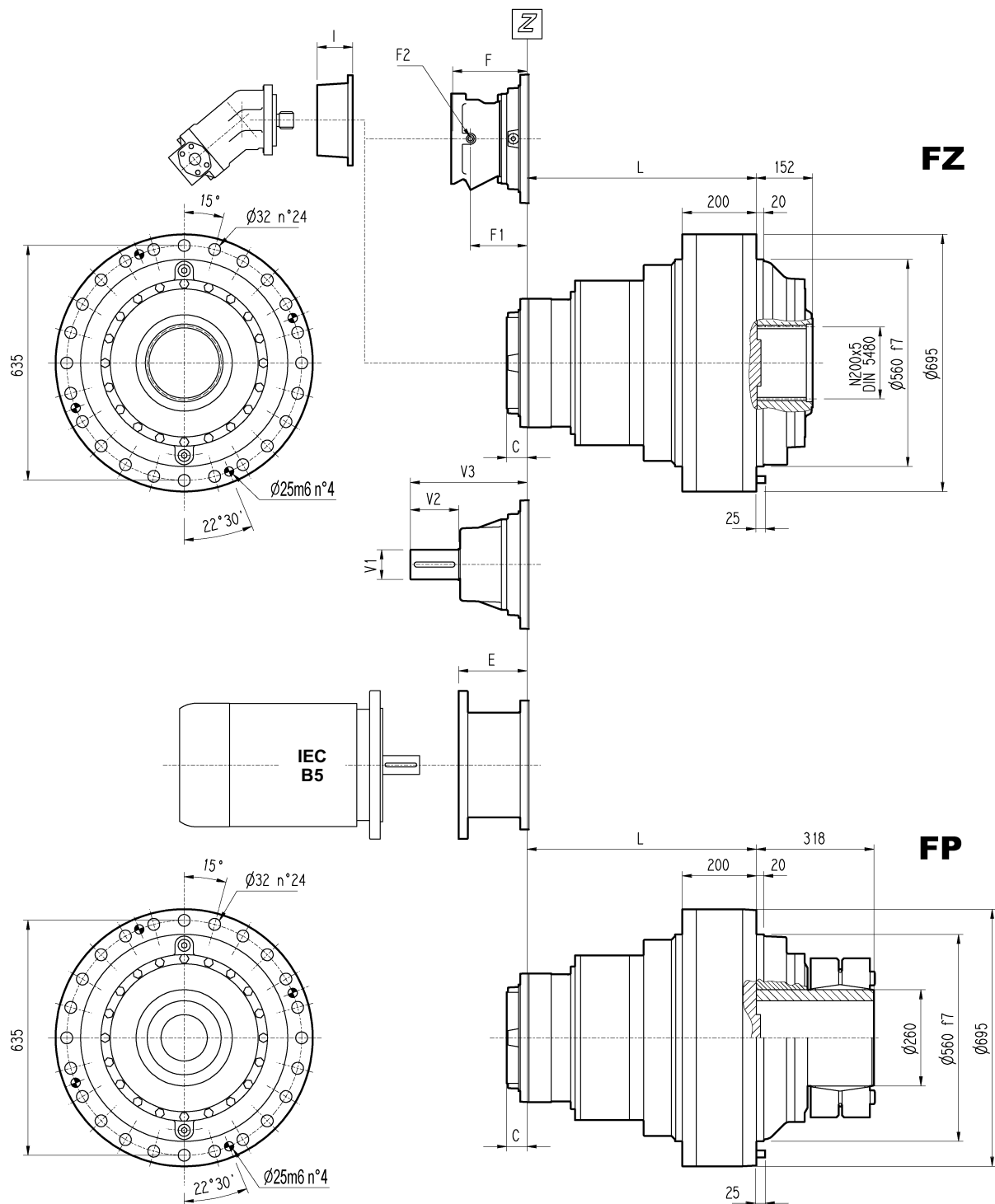
Hinweis: Die Kennzeichnungen (A) (B) (C) an der gleichen Baugröße weisen auf die Winkelreduzierung in unterschiedlichen Maßen hin: siehe Seiten mit Maßtabellen.

Remarque : les indications (A) (B) (C) sur la même taille indique des réductions angulaires de dimensions différentes. Se reporter aux pages des dimensions.

# 317L



317L

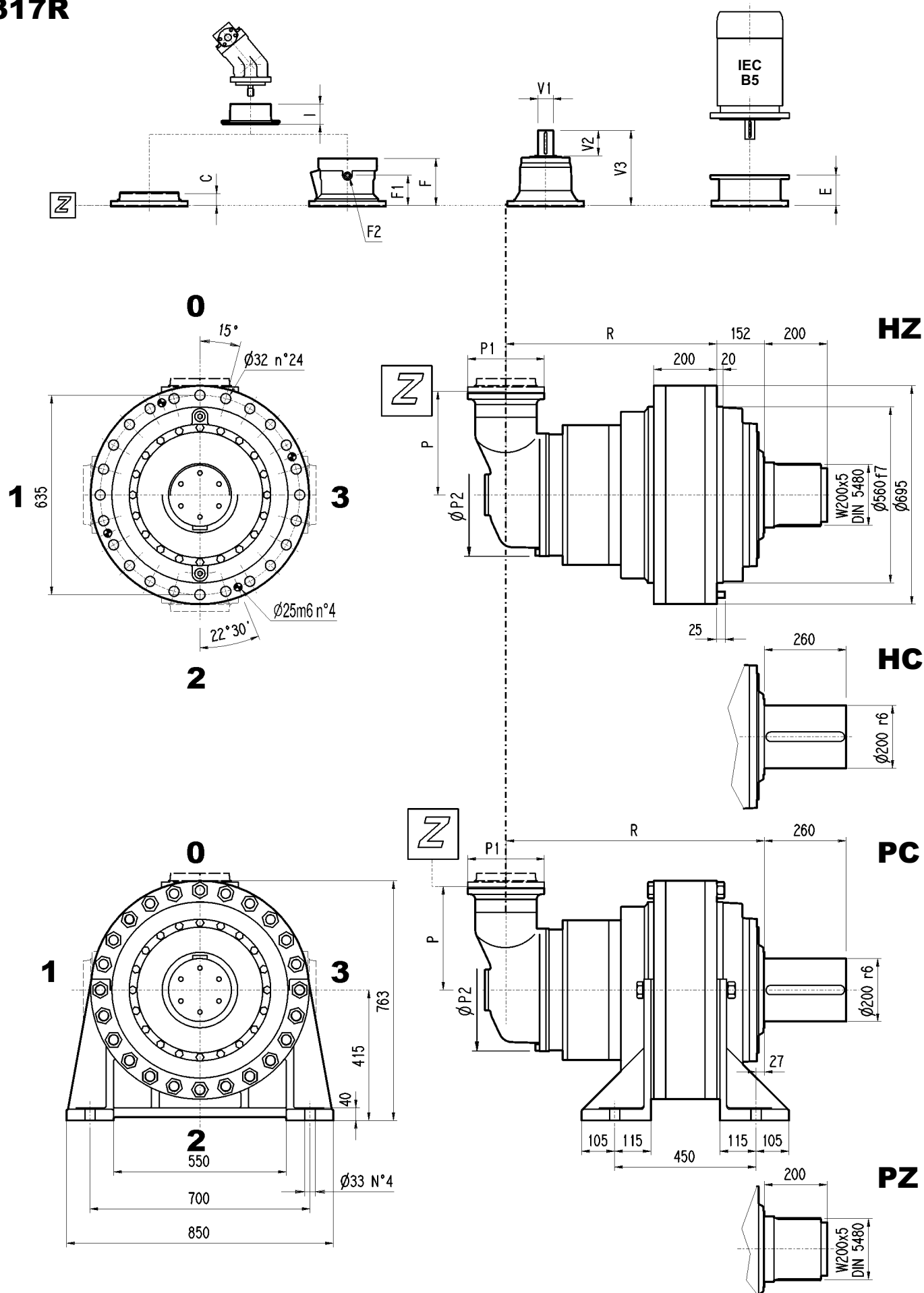


|                                                 |                                                                                               |            |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------|------------|
| VERSIONE FP/FP VERSION<br>VERSION FP/VERSION FP | COPPIA MAX. TRASMISS./MAX. TRANSMISS. TORQUE<br>MAX. ÜBERTR. MOMENT/COUPLE MAX. TRANSMISSIBLE | 216 000 Nm |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------|------------|

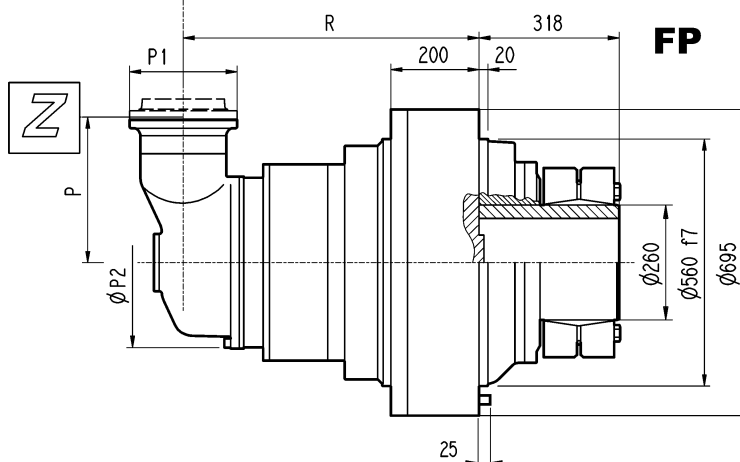
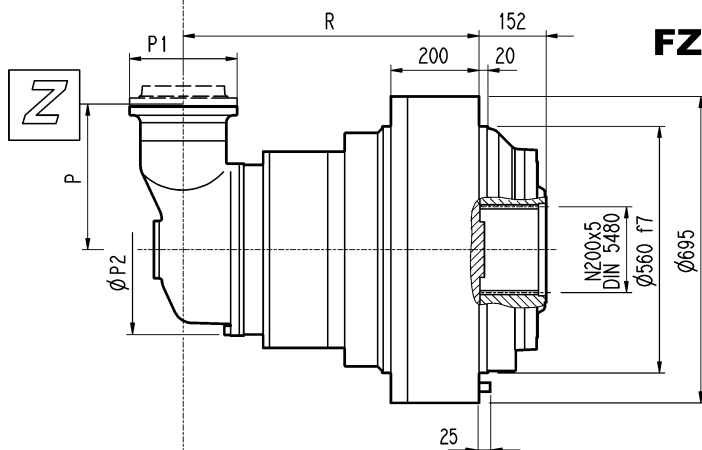
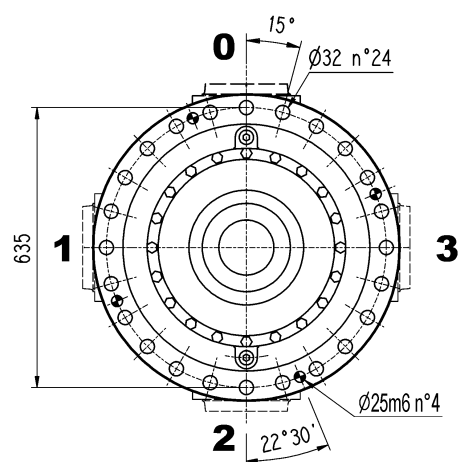
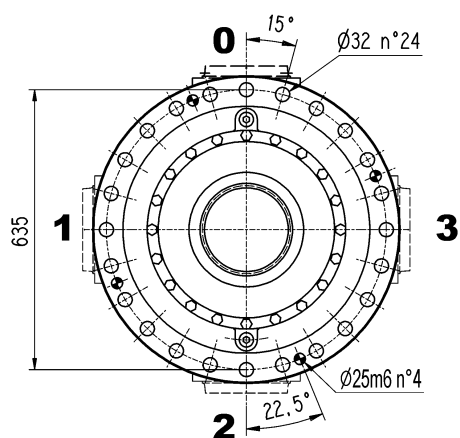
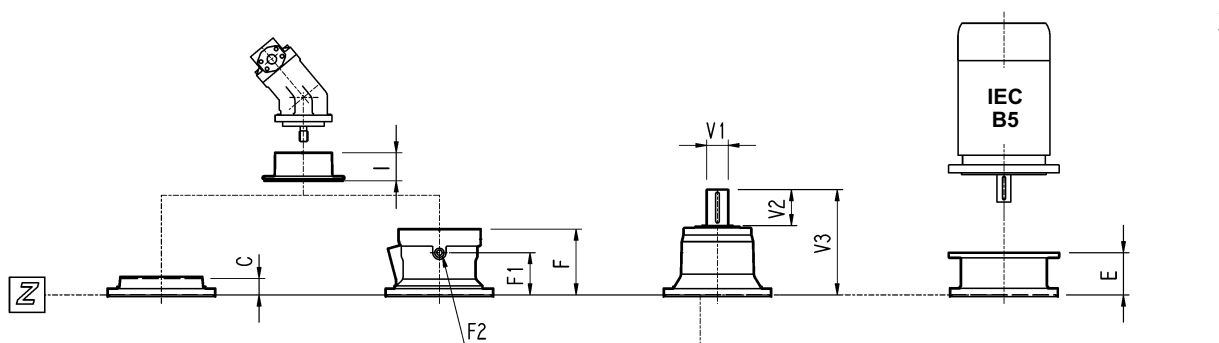
|        | L        |          |     |     |  |          |     |       |  |                                       |    |  |     |     |                             |                                       |                                                                                       |    |
|--------|----------|----------|-----|-----|-------------------------------------------------------------------------------------|----------|-----|-------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-----|-----------------------------|---------------------------------------|---------------------------------------------------------------------------------------|----|
|        | HZ<br>HC | PC<br>PZ | FZ  | FP  | HZ<br>HC                                                                            | PC<br>PZ | FZ  | FP    | C                                                                                   | Entrata<br>Input<br>Antrieb<br>Entrée | I                                                                                     | F                                                                                     | F1  | F2  | Tipo<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |  |    |
| 317 L1 | 163      | 315      | 163 | 163 | 800                                                                                 | 950      | 750 | 800   | 181                                                                                 | F                                     |  |                                                                                       |     |     |                             |                                       |                                                                                       |    |
| 317 L2 | 472      | 624      | 472 | 472 | 930                                                                                 | 1 080    | 880 | 930   | 75                                                                                  | D                                     |                                                                                       |                                                                                       |     |     |                             |                                       |                                                                                       |    |
| 317 L3 | 621      | 773      | 621 | 621 | 990                                                                                 | 1 140    | 940 | 990   | 51                                                                                  | B                                     |                                                                                       |                                                                                       | 201 | 153 | 1/4 G                       | 6                                     | B                                                                                     | 28 |
| 317 L4 | 710      | 862      | 710 | 710 | 1 002                                                                               | 1 152    | 952 | 1 002 | 37                                                                                  | A                                     |                                                                                       | 191                                                                                   | 145 | 95  | 1/4 G                       | 5                                     | A                                                                                     | 16 |

|        | V1 | V2  | V3  | Kg | V1 | V2  | V3  | Kg | E          |            |            |            |            |            |     |  |
|--------|----|-----|-----|----|----|-----|-----|----|------------|------------|------------|------------|------------|------------|-----|--|
|        |    |     |     |    |    |     |     |    | IEC<br>132 | IEC<br>160 | IEC<br>180 | IEC<br>200 | IEC<br>225 | IEC<br>250 |     |  |
| 317 L1 |    |     |     |    |    |     |     |    |            |            |            |            |            |            |     |  |
| 317 L2 | 80 | 130 | 343 | 35 |    |     |     |    |            |            |            |            |            |            |     |  |
| 317 L3 | 80 | 130 | 315 | 35 | 60 | 105 | 313 | 28 |            |            |            | 195        | 186        | 216        | 215 |  |
| 317 L4 | 48 | 82  | 239 | 15 |    |     |     |    |            |            |            | 114        | 144        | 144        | 174 |  |

**317R**



# 317R

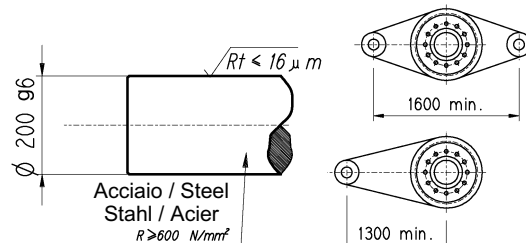
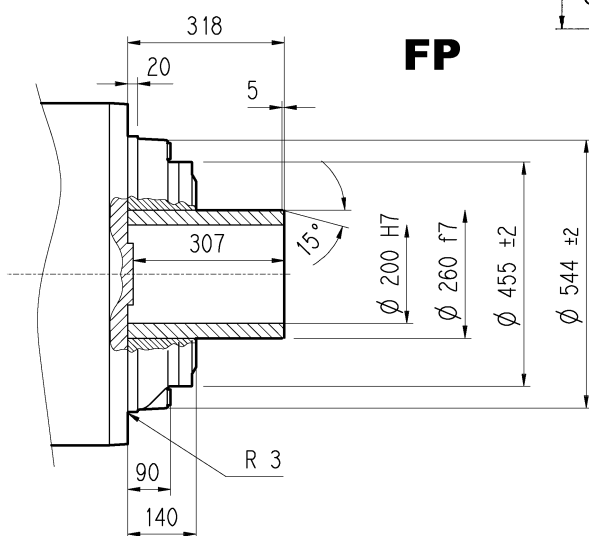
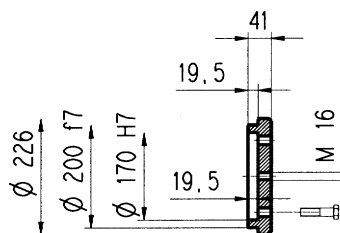
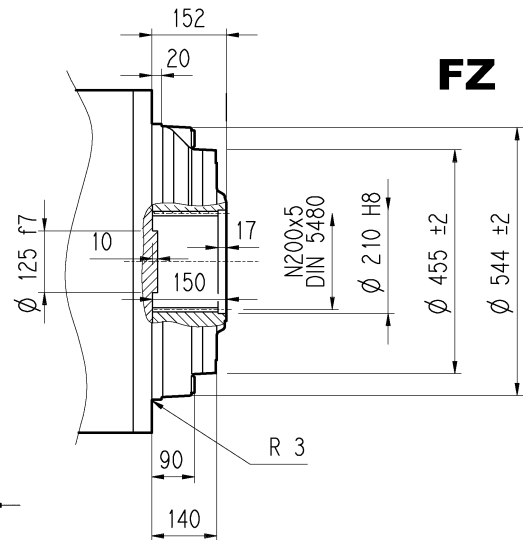
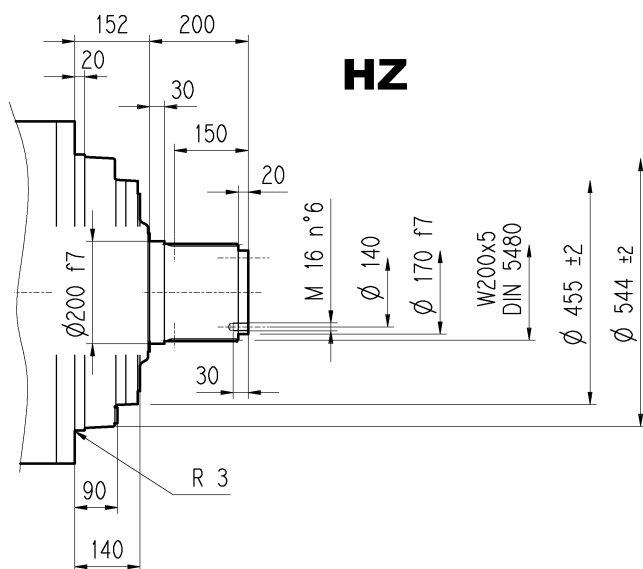
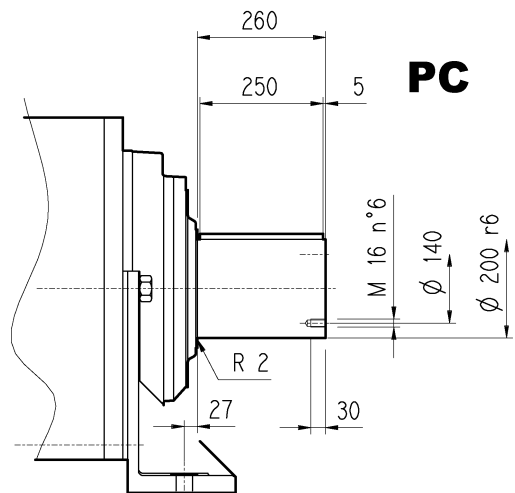
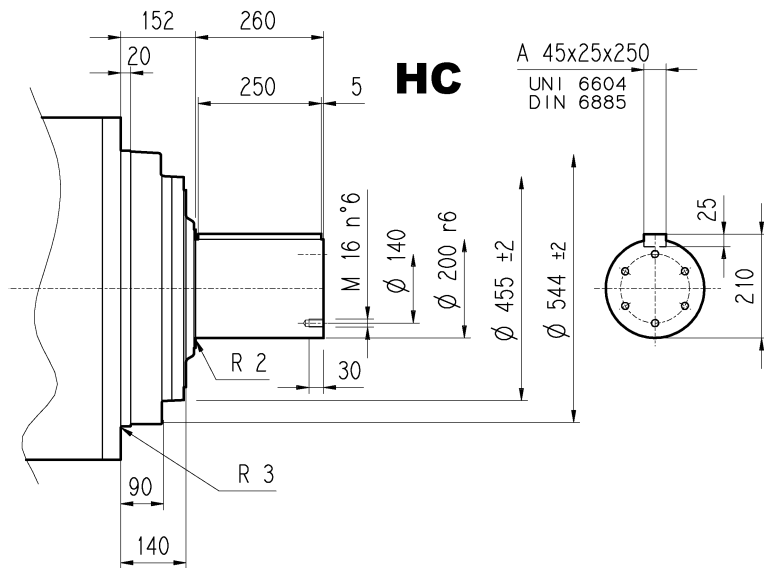


|                                                       |                                                                                                            |            |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | 216 000 Nm |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------|

|            | R        |          |     |     | P   | P1  | P2  |  |          |      |      |  |                                       |         |  |     |       |                             |                                       |                                                                                       |
|------------|----------|----------|-----|-----|-----|-----|-----|-------------------------------------------------------------------------------------|----------|------|------|-------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-------|-----------------------------|---------------------------------------|---------------------------------------------------------------------------------------|
|            | HZ<br>HC | PC<br>PZ | FZ  | FP  |     |     |     | HZ<br>HC                                                                            | PC<br>PZ | FZ   | FP   | C                                                                                   | Entrata<br>Input<br>Antrieb<br>Entrée | I                                                                                            | F                                                                                     | F1  | F2    | Typo<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |  |
| 317 R3 (B) | 701      | 853      | 701 | 701 | 345 | 262 | 400 | 1060                                                                                | 1210     | 1010 | 1060 | 45                                                                                  | B                                     | <br>191 | 195                                                                                   | 147 | 1/4 G | 6                           | B                                     | 28                                                                                    |
| 317 R3 (C) | 701      | 853      | 701 | 701 | 390 | 262 | 480 | 1070                                                                                | 1220     | 1020 | 1070 | 45                                                                                  | B                                     |                                                                                              | 195                                                                                   | 147 | 1/4 G | 6                           | B                                     | 28                                                                                    |
| 317 R3 (A) | 701      | 853      | 701 | 701 | 330 | 245 | 390 | 1040                                                                                | 1190     | 990  | 1040 | 37                                                                                  | A                                     |                                                                                              | 145                                                                                   | 95  | 1/4 G | 5                           | A                                     | 16                                                                                    |
| 317 R4     | 740      | 892      | 740 | 740 | 225 | 245 | 345 | 1040                                                                                | 1190     | 990  | 1040 | 37                                                                                  | A                                     |                                                                                              | 105                                                                                   | 65  | 1/4 G | 4                           | A                                     | 10                                                                                    |

|            | V1 | V2  | V3  |  | V1 | V2 | V3 |  | E      |        |        |         |         |         |         |         |         |         |         |
|------------|----|-----|-----|-------------------------------------------------------------------------------------|----|----|----|---------------------------------------------------------------------------------------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
|            |    |     |     |                                                                                     |    |    |    |                                                                                       | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 | IEC 200 | IEC 225 | IEC 250 |
| 317 R3 (B) | 60 | 105 | 307 | 23                                                                                  |    |    |    |                                                                                       |        |        |        |         |         |         |         | 152     | 182     | 212     | 193     |
| 317 R3 (C) | 60 | 105 | 307 | 23                                                                                  |    |    |    |                                                                                       |        |        |        |         |         |         |         | 152     | 182     | 212     | 193     |
| 317 R3 (A) | 48 | 82  | 239 | 15                                                                                  |    |    |    |                                                                                       |        |        |        |         |         |         |         |         |         |         |         |
| 317 R4     | 48 | 82  | 239 | 15                                                                                  |    |    |    |                                                                                       |        |        |        |         |         | 114     | 144     | 144     | 174     |         |         |
|            |    |     |     |                                                                                     |    |    |    |                                                                                       |        |        |        |         |         | 114     | 144     | 144     | 174     |         |         |

# 317L - 317R

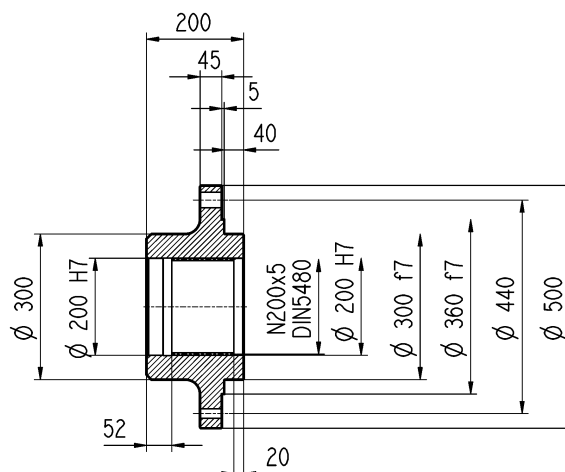
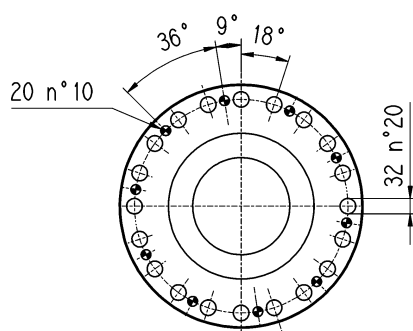
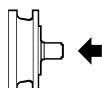


|             |                           |                      |
|-------------|---------------------------|----------------------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | <b>216 000</b><br>Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |                      |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |                      |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |                      |

Flangia / Flange  
Flansch / Brides

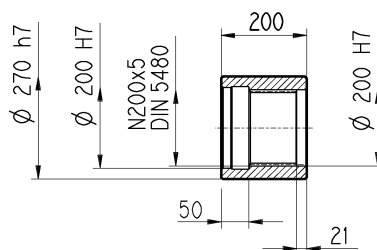
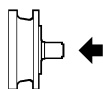
**317L - 317R**

**W0A**



Materiale : Acciaio C40  
Material : Steel C40  
Material : Stahl C40  
Màterial : Acier C40

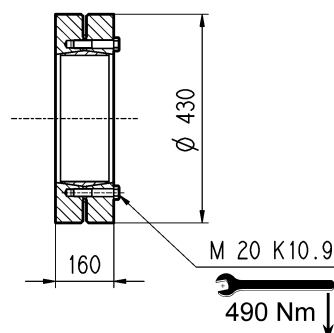
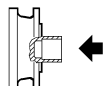
Manicotti lisci / Sleeve couplings  
Naben / Manchons lisses a cannelure interieure



**M0A**

Materiale : Acciaio 16CrNi4  
Material : Steel 16CrNi4  
Material : Stahl 16CrNi4  
Màterial : Acier 16CrNi4

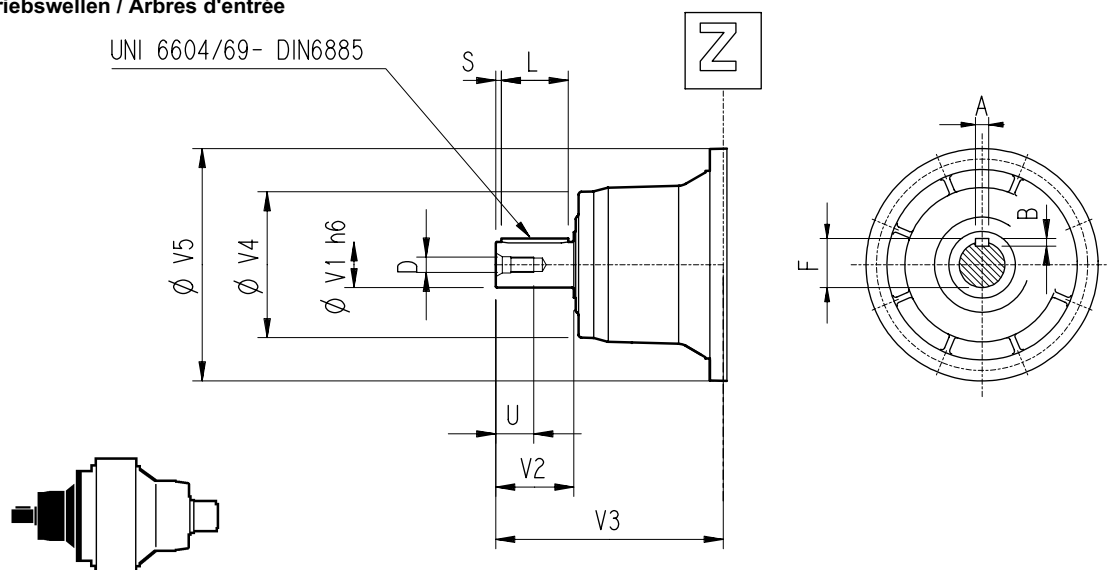
Giunto ad attrito / Shrink disc  
Schrumpfscheibe / Frette de serrage



**G0A**

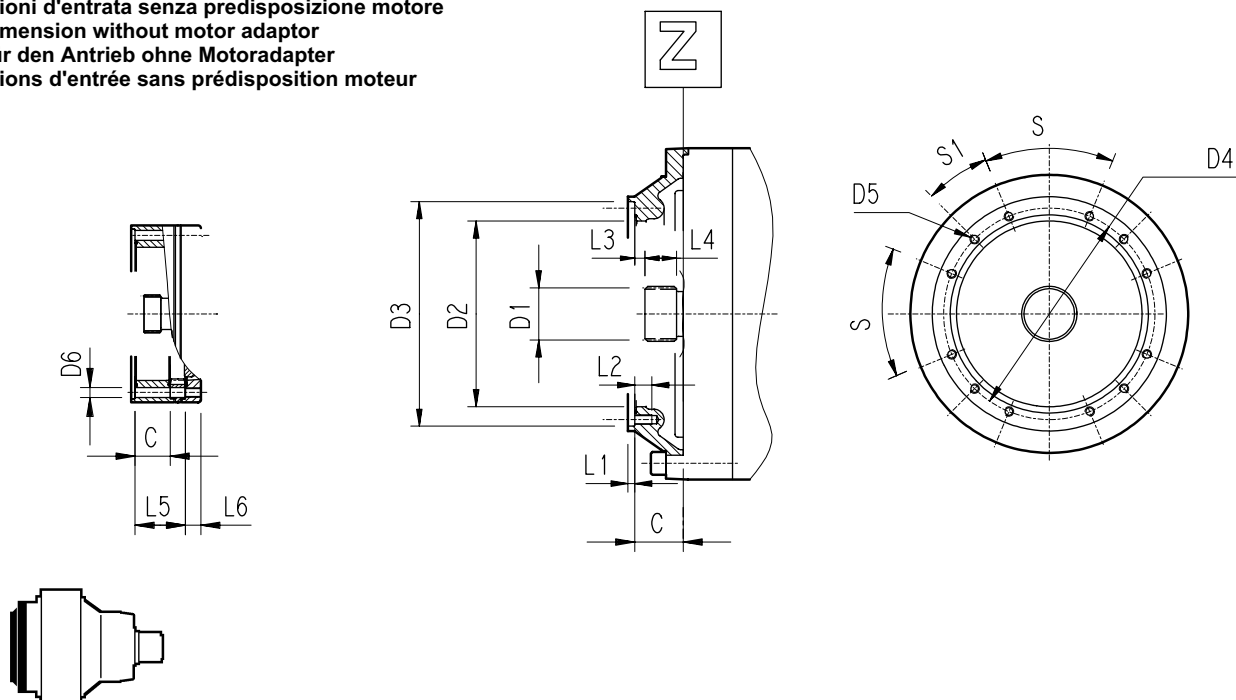
# 317L - 317R

Alberi veloci / Input shaft  
Antriebswellen / Arbres d'entrée



|                | CODE | V1 | V2  | V3  | V4  | V5  | A  | B  | F    | L   | S   | D   | U  |
|----------------|------|----|-----|-----|-----|-----|----|----|------|-----|-----|-----|----|
| 317 L2         | V11B | 80 | 130 | 343 | 200 | 428 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
| 317 L3         | V07B | 80 | 130 | 315 | 200 | 345 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
|                | V07A | 60 | 105 | 313 | 155 | 345 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |
| 317 L4         | V05B | 48 | 82  | 239 | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 317 R3 (A)-R4  | V05B | 48 | 82  | 239 | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 317 R3 (B) (C) | V06B | 60 | 105 | 307 | 155 | 292 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |

Dimensioni d'entrata senza predisposizione motore  
Input dimension without motor adaptor  
Maße für den Antrieb ohne Motoradapter  
Dimensions d'entrée sans prédisposition moteur



|                  | C   | D1             | D2  | D3     | D4  | D5       | D6 | L1 | L2 | L3  | L4 | L5 | L6 | S   | S1    | Entrata<br>Input<br>Antrieb<br>Entrée |
|------------------|-----|----------------|-----|--------|-----|----------|----|----|----|-----|----|----|----|-----|-------|---------------------------------------|
| 317 L1           | 181 | 120x3 DIN 5480 | 365 | 390 f7 | 415 | M16 n°18 | /  | 4  | 30 | 3   | 65 | /  | /  | 20° | 20°   | F                                     |
| 317 L2           | 75  | 80x74 DIN 5482 | 270 | 335 H7 | 314 | M16 n°8  | /  | 5  | 30 | 9.5 | 40 | /  | /  | 60° | 30°   | D                                     |
| 317 L3           | 51  | 58x53 DIN 5482 | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11  | 22 | /  | /  | 45° | 22.5° | B                                     |
| 317 L4           | 37  | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 0  | 4  | 18 | 9   | 18 | 0  | 0  | 45° | 45°   | A                                     |
| 317 R2-R3 (A)-R4 | 37  | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | 18 | 9   | 18 | 0  | 0  | 45° | 45°   | A                                     |
| 317 R3 (B) (C)   | 45  | 58x53 DIN 5482 | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11  | 22 | /  | /  | 45° | 22.5° | B                                     |

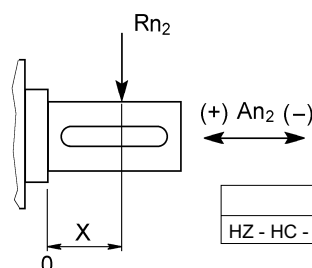
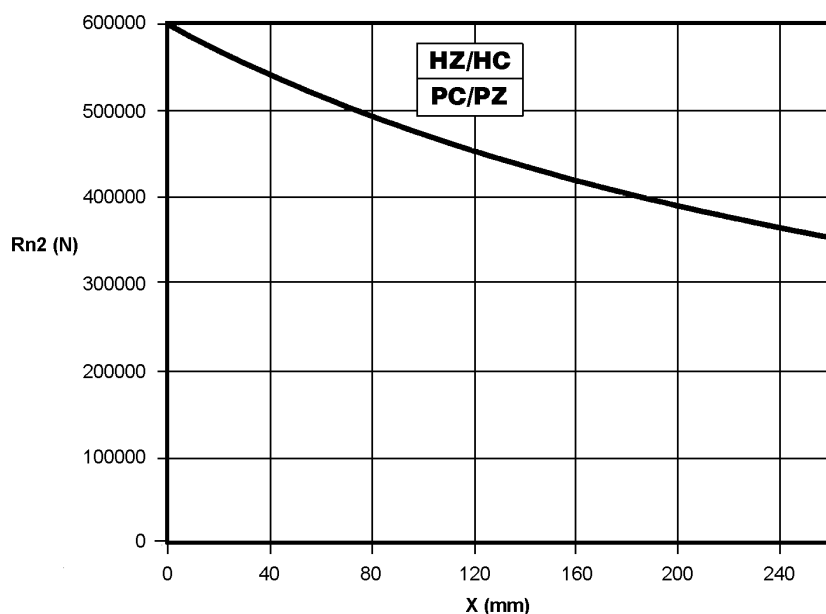
## 317L - 317R

Carichi radiali ed assiali ammissibili sull'albero lento per un valore di  $Fh_2 : n_2 \cdot h = 10\,000$

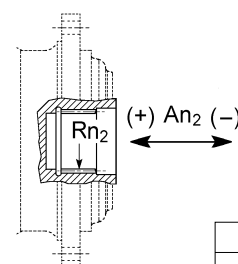
Permissible radial and axial loads on output shaft with  $Fh_2$   
 $n_2 \cdot h = 10\,000$

An der Ausgangswelle zulässige Radiallasten und Axialkräfte für einen Wert von  $Fh_2$   
 $n_2 \cdot h = 10\,000$

Charges radiales et axiales admises sur l'arbre lent pour une valeur de  $Fh_2 : n_2 \cdot h = 10\,000$



|                   | $An_2 (+)$ | $An_2 (-)$ |
|-------------------|------------|------------|
| HZ - HC - PC - PZ | 360 000    | 300 000    |



|    | $Rn_2$  | $An_2 (+/-)$ |
|----|---------|--------------|
| FZ | 150 000 | 150 000      |

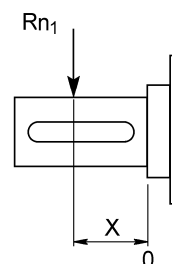
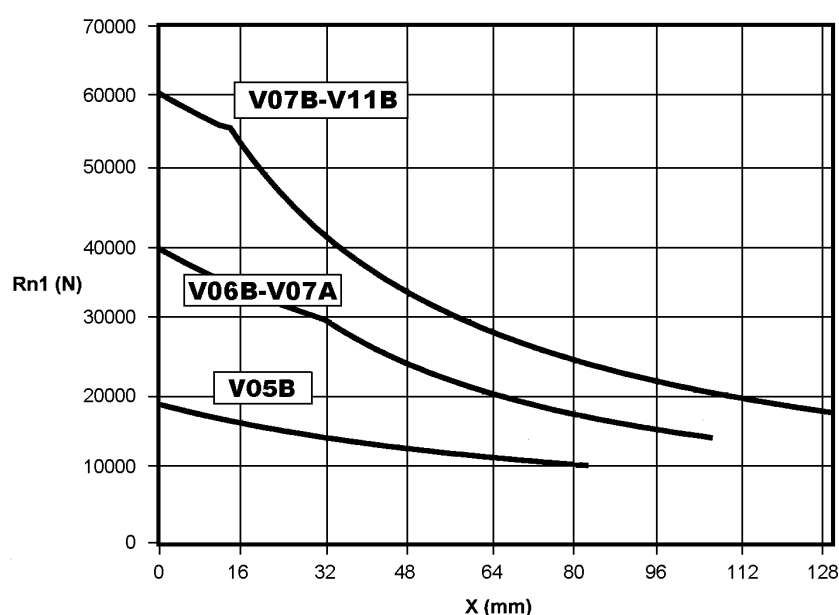
| Fattore fh <sub>2</sub> correttivo per carichi sugli alberi<br>Load corrective factor fh <sub>2</sub> on shafts<br>Korrektionsfaktor fh <sub>2</sub> für wellenbelastungen<br>Facteur de corretion fh <sub>2</sub> pour charges sur les arbres | Fh <sub>2</sub> = n <sub>2</sub> · h |                   | 10 000 | 25 000 | 50 000 | 100 000 | 500 000 | 1 000 000 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------|--------|--------|--------|---------|---------|-----------|
|                                                                                                                                                                                                                                                | fh <sub>2</sub>                      | FZ                | 1      | 0.74   | 0.58   | 0.46    | 0.27    | 0.21      |
|                                                                                                                                                                                                                                                |                                      | HZ - HC - PC - PZ | 1      | 0.76   | 0.61   | 0.50    | 0.31    | 0.25      |

Carichi radiali ammissibili sull'albero veloce per un valore di  $Fh_1$   
 $n_1 \cdot h = 250\,000$

Permissible radial loads on input shaft with  $Fh_1 : n_1 \cdot h = 250\,000$

An der Antriebswelle zulässige Radiallasten für einen Wert von  $Fh_1$   
 $n_1 \cdot h = 250\,000$

Charges radiales admises sur l'arbre d'entrée pour une valeur de  $Fh_1 : n_1 \cdot h = 250\,000$



| Fattore $fh_1$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_1$ on shafts<br>Korrektionsfaktor $fh_1$ für wellenbelastungen<br>Facteur de correction $fh_1$ pour charges sur les arbres | $Fh_1 = n_1 \cdot h$ |         |         |           |           |           |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|---------|-----------|-----------|-----------|------------|
|                                                                                                                                                                                                             | $fh_1$               | 250 000 | 500 000 | 1 000 000 | 2 000 000 | 5 000 000 | 10 000 000 |
|                                                                                                                                                                                                             |                      | 1       | 0.79    | 0.63      | 0.50      | 0.37      | 0.29       |

# 318L

**M<sub>2</sub> = 200000 Nm**

|  | i     | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|-----------------------------------------------------------------------------------|-------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                   |       | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h |                |                |                      |                      |                |                                                                                     |
|                                                                                   | 1:    | 10 000               | 25 000            | 50 000            | 100 000           | 500 000           | 1 000 000         | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>L1</b>                                                                         | 4.40  | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 340            | 95             | 200                  | 300                  |                |                                                                                     |
| <b>L2</b>                                                                         | 18.0  | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 220            | 63             | 500                  | 800                  |                |                                                                                     |
|                                                                                   | 23.1  | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 220            | 63             | 500                  | 800                  |                |                                                                                     |
|                                                                                   | 27.4  | 244 000              | 209 000           | 209 000           | 173 000           | 107 000           | 87 000            | 220            | 63             | 500                  | 800                  |                |                                                                                     |
| <b>L3</b>                                                                         | 73.6  | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 140            | 40             | 1 400                | 2 000                |                |                                                                                     |
|                                                                                   | 94.5  | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 140            | 40             | 1 400                | 2 000                | 3 200          | 6L                                                                                  |
|                                                                                   | 112   | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 140            | 40             | 1 400                | 2 000                | 3 200          | 6L                                                                                  |
|                                                                                   | 121   | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 140            | 40             | 1 400                | 2 000                | 2 600          | 6K                                                                                  |
|                                                                                   | 144   | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 140            | 40             | 1 400                | 2 000                | 2 100          | 6G                                                                                  |
|                                                                                   | 171   | 244 000              | 209 000           | 209 000           | 173 000           | 107 000           | 87 000            | 140            | 40             | 1 400                | 2 000                | 2 100          | 6G                                                                                  |
| <b>L4</b>                                                                         | 253   | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 60             | 22             | 1 800                | 3 800                | 1 500          | 6E                                                                                  |
|                                                                                   | 301   | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 60             | 22             | 1 800                | 3 800                | 1 100          | 6C                                                                                  |
|                                                                                   | 324   | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 60             | 22             | 1 800                | 3 800                | 1 100          | 6C                                                                                  |
|                                                                                   | 387   | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 60             | 22             | 1 800                | 3 800                | 850            | 6B                                                                                  |
|                                                                                   | 416   | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 60             | 22             | 1 800                | 3 800                | 850            | 6B                                                                                  |
|                                                                                   | 459   | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 60             | 22             | 1 800                | 3 800                | 850            | 6B                                                                                  |
|                                                                                   | 496   | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 60             | 22             | 1 800                | 3 800                | 850            | 6B                                                                                  |
|                                                                                   | 589   | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 60             | 22             | 1 800                | 3 800                | 850            | 6B                                                                                  |
|                                                                                   | 637   | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 60             | 22             | 1 800                | 3 800                | 850            | 6B                                                                                  |
|                                                                                   | 698   | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 60             | 22             | 1 800                | 3 800                | 850            | 6B                                                                                  |
|                                                                                   | 756   | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 60             | 22             | 1 800                | 3 800                | 850            | 6B                                                                                  |
|                                                                                   | 897   | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 50             | 22             | 1 800                | 3 800                | 850            | 6B                                                                                  |
|                                                                                   | 1 064 | 244 000              | 209 000           | 209 000           | 173 000           | 107 000           | 87 000            | 42             | 22             | 1 800                | 3 800                | 850            | 6B                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

**M<sub>2</sub> = 200000 Nm**

**318R**

|  | i   | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|----------------------------------------------------------------------------------|-----|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                  | 1:  | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>R4 (B)</b>                                                                    | 216 | 250 000              | 250 000           | 213 000           | 173 000           | 104 000           | 87 000            | 150            | 90             | 1 500                | 2 500                | 1 500          | 6E                                                                                  |
|                                                                                  | 278 | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 150            | 90             | 1 500                | 2 500                | 1 500          | 6E                                                                                  |
|                                                                                  | 330 | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 135            | 90             | 1 500                | 2 500                | 1 100          | 6C                                                                                  |
|                                                                                  | 357 | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 125            | 90             | 1 500                | 2 500                | 1 100          | 6C                                                                                  |
|                                                                                  | 423 | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 106            | 90             | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                  | 502 | 244 000              | 209 000           | 209 000           | 173 000           | 107 000           | 87 000            | 86             | 90             | 1 500                | 2 500                | 850            | 6B                                                                                  |
| <b>R4 (C)</b>                                                                    | 299 | 250 000              | 208 000           | 168 000           | 137 000           | 84 000            | 69 000            | 149            | 110            | 1 500                | 2 500                | 1 100          | 6C                                                                                  |
|                                                                                  | 384 | 250 000              | 245 000           | 202 000           | 163 000           | 103 000           | 82 000            | 116            | 110            | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                  | 456 | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 98             | 110            | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                  | 493 | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 90             | 110            | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                  | 585 | 250 000              | 250 000           | 213 000           | 173 000           | 107 000           | 87 000            | 76             | 110            | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                  | 695 | 244 000              | 209 000           | 209 000           | 173 000           | 107 000           | 87 000            | 62             | 110            | 1 500                | 2 500                | 850            | 6B                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

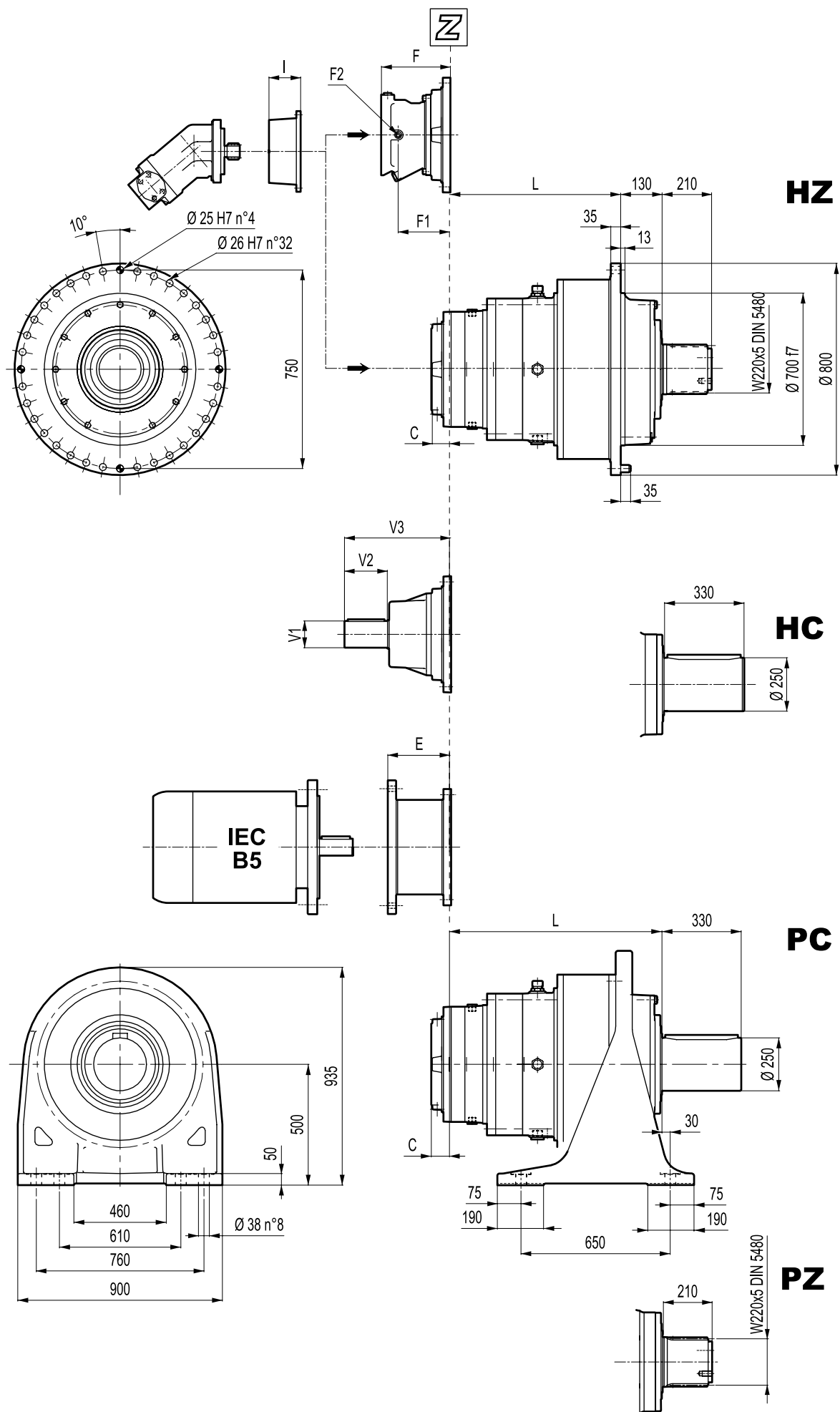
Nota: i contrassegni (A) (B) (C) sulla stessa grandezza, indicano riduzioni angolari di dimensioni differenti: vedere le pagine dimensionali.

Note: Letters (A) (B) (C) near size indication identify different angle reduction dimensions. See pages relevant to dimensions.

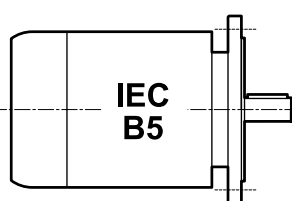
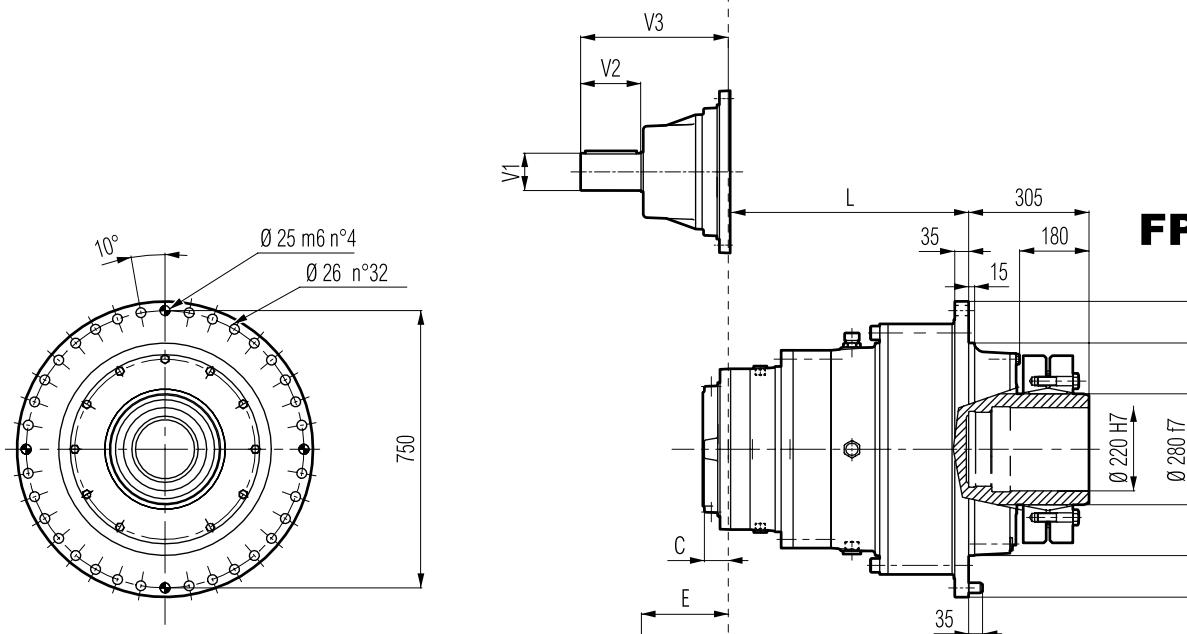
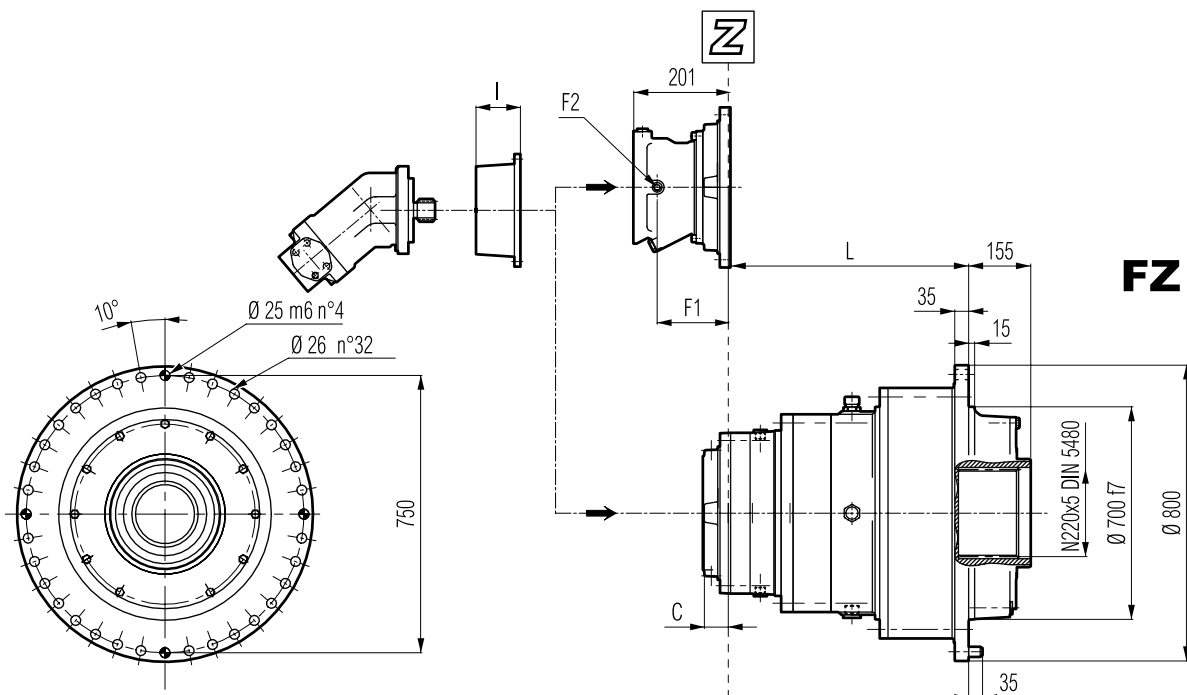
Hinweis: Die Kennzeichnungen (A) (B) (C) an der gleichen Baugröße weisen auf die Winkelreduzierung in unterschiedlichen Maßen hin: siehe Seiten mit Maßtabellen.

Remarque : les indications (A) (B) (C) sur la même taille indique des réductions angulaires de dimensions différentes. Se reporter aux pages des dimensions.

# 318L



# 318L



VERSIONE FP  
FP VERSION  
VERSION FP  
VERSION FP

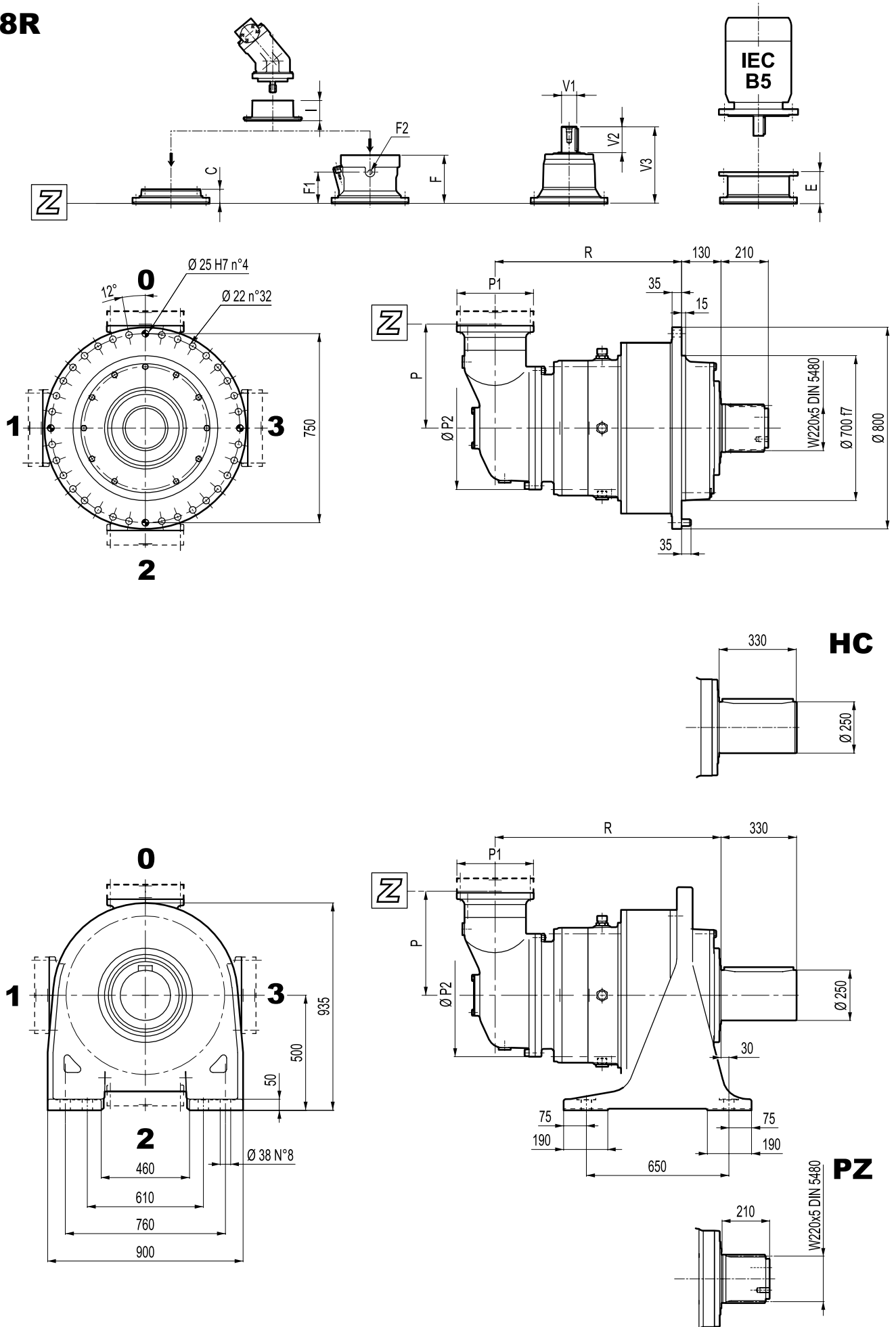
COPPIA MAX. TRASMISSIBILE  
MAX. TRANSMISSIBLE TORQUE  
MAX. ÜBERTR. MOMENT  
COUPLE MAX. TRASMISSIBILE

**300 000 Nm**

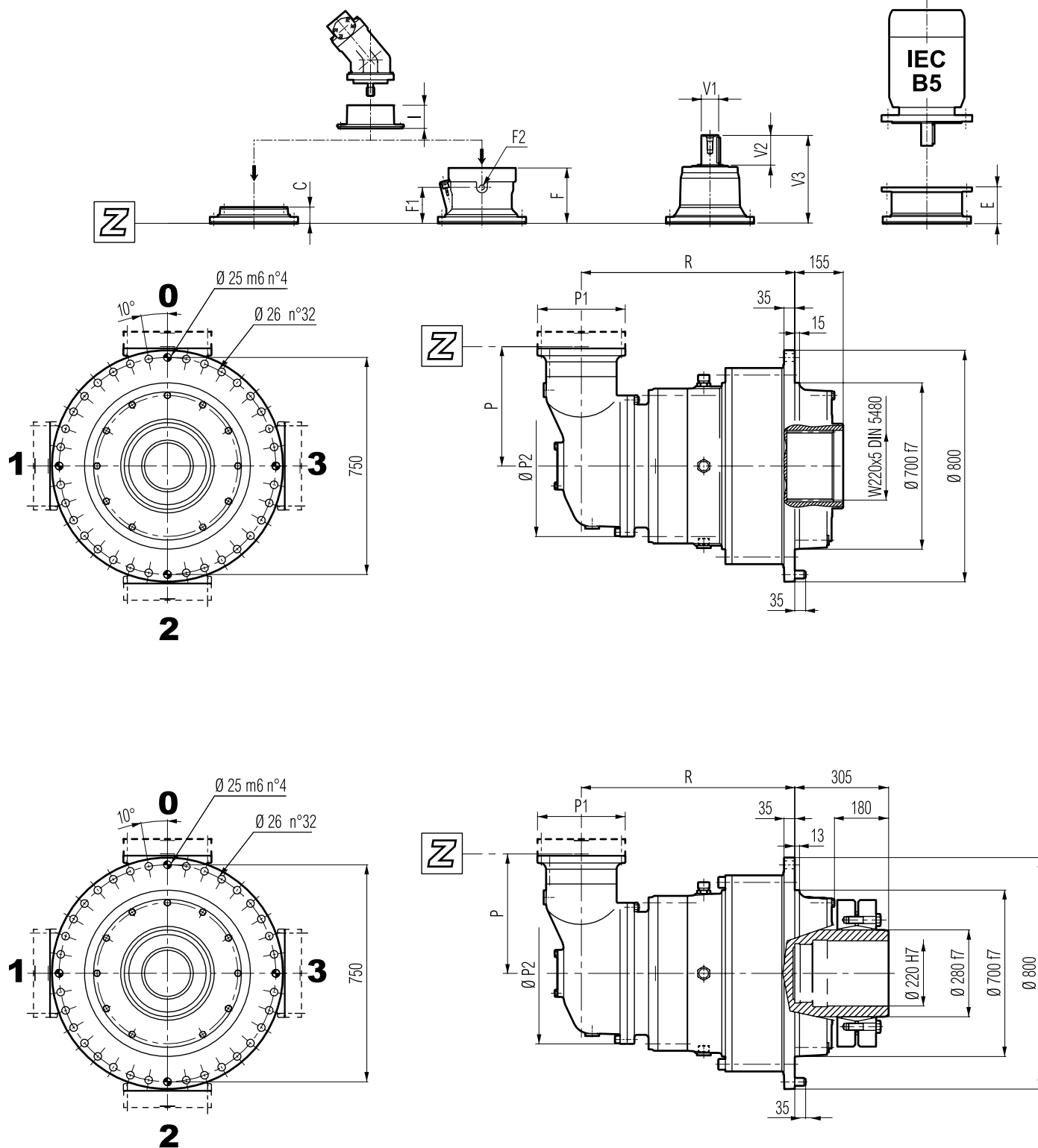
|        | L        |          |     |     |  |          |      |      |  |                                       |  |  |     |     |                             |                                       |                                                                                       |    |
|--------|----------|----------|-----|-----|-------------------------------------------------------------------------------------|----------|------|------|-------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-----|-----------------------------|---------------------------------------|---------------------------------------------------------------------------------------|----|
|        | HZ<br>HC | PC<br>PZ | FZ  | FP  | HZ<br>HC                                                                            | PC<br>PZ | FZ   | FP   | C                                                                                   | Entrata<br>Input<br>Antrieb<br>Entrée | I                                                                                   | F                                                                                     | F1  | F2  | Tipo<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |  |    |
| 318 L1 | 202      | 332      | 202 | 202 | 950                                                                                 | 1250     | 800  | 830  | 208                                                                                 |                                       |  |                                                                                       |     |     |                             |                                       |                                                                                       |    |
| 318 L2 | 547      | 677      | 547 | 547 | 1200                                                                                | 1500     | 1050 | 1080 | 116                                                                                 | E                                     |                                                                                     |                                                                                       |     |     |                             |                                       |                                                                                       |    |
| 318 L3 | 759      | 889      | 759 | 759 | 1300                                                                                | 1600     | 1150 | 1180 | 81                                                                                  | D                                     |                                                                                     |                                                                                       | 232 | 185 | 1/4 G                       | 6                                     | B                                                                                     | 28 |
| 318 L4 | 892      | 970      | 892 | 892 | 1350                                                                                | 1650     | 1200 | 1230 | 51                                                                                  | B                                     |                                                                                     | 191                                                                                   | 201 | 153 | 1/4 G                       | 6                                     | B                                                                                     | 28 |

|        | V1 | V2  | V3  | Kg | V1 | V2  | V3  | Kg | E       |         |         |         |         |         |
|--------|----|-----|-----|----|----|-----|-----|----|---------|---------|---------|---------|---------|---------|
|        |    |     |     |    |    |     |     |    | IEC 132 | IEC 160 | IEC 180 | IEC 200 | IEC 225 | IEC 250 |
| 318 L1 |    |     |     |    |    |     |     |    |         |         |         |         |         |         |
| 318 L2 |    |     |     |    |    |     |     |    |         |         |         |         |         |         |
| 318 L3 | 80 | 130 | 348 | 35 |    |     |     |    |         |         |         |         |         |         |
| 318 L4 | 80 | 130 | 315 | 35 | 60 | 105 | 313 | 28 |         |         | 195     | 186     | 216     | 215     |

# 318R



# 318R

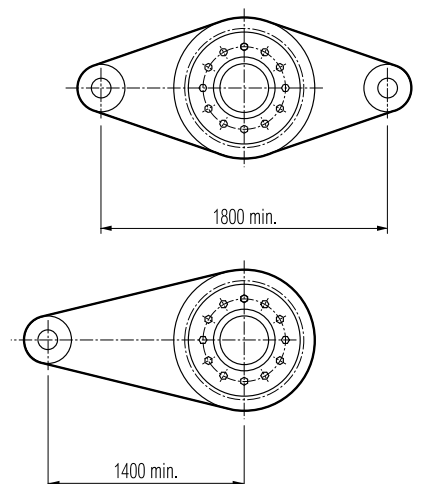
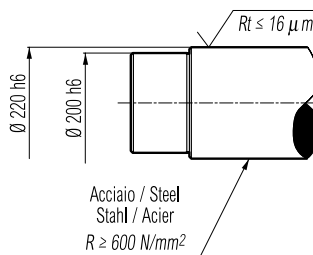
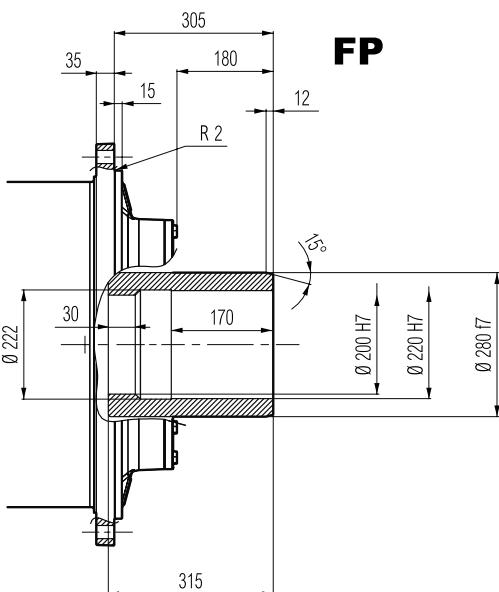
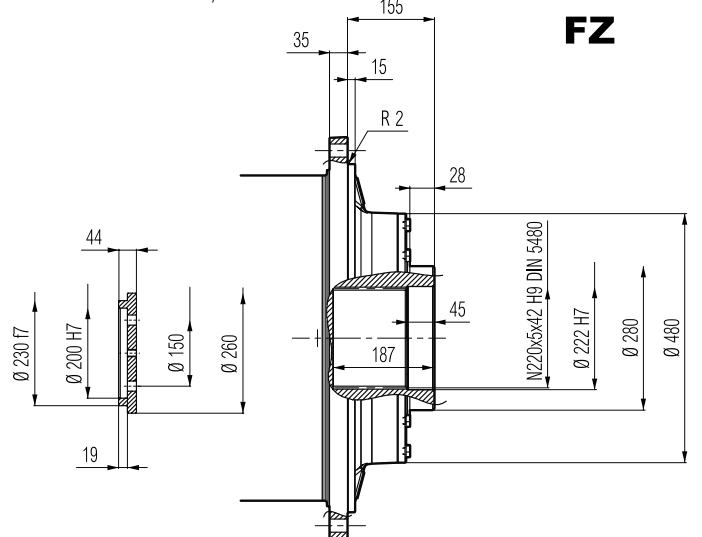
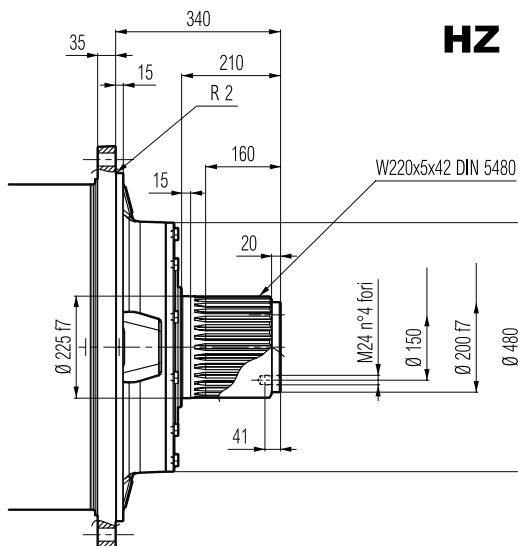
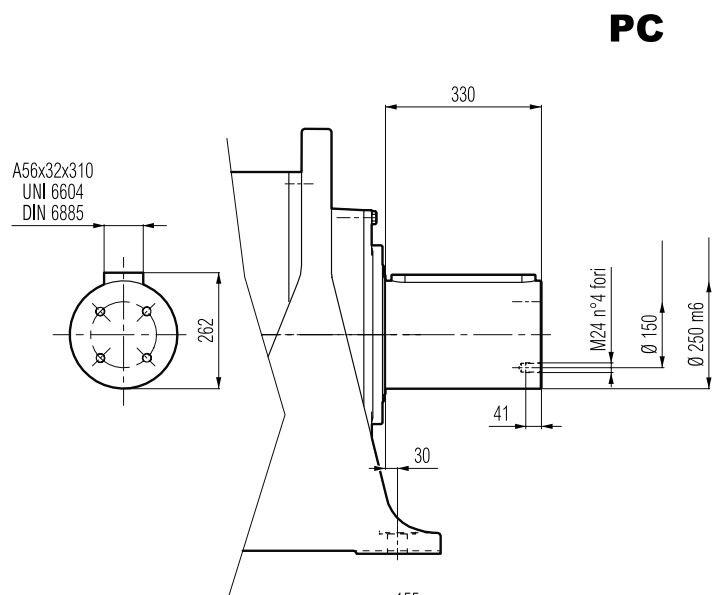
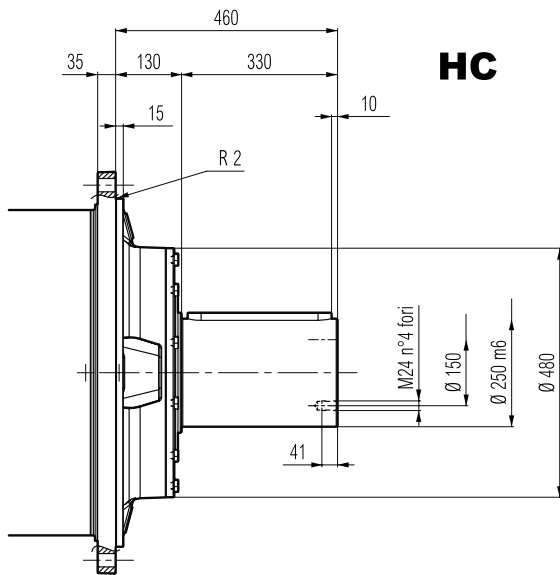


|                                                       |                                                                                                            |            |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | 300 000 Nm |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------|

|            | R        |          |     |     | P   | P1  | P2  |  |          |      |      |  |                                       |  |  |     |       |                             |                                       |                                                                                       |
|------------|----------|----------|-----|-----|-----|-----|-----|-------------------------------------------------------------------------------------|----------|------|------|--------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-------|-----------------------------|---------------------------------------|---------------------------------------------------------------------------------------|
|            | HZ<br>HC | PC<br>PZ | FZ  | FP  |     |     |     | HZ<br>HC                                                                            | PC<br>PZ | FZ   | FP   | C                                                                                    | Entrata<br>Input<br>Antrieb<br>Entrée | I                                                                                     | F                                                                                     | F1  | F2    | Tipo<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |  |
| 318 R4 (B) | 985      | 1115     | 985 | 985 | 345 | 292 | 400 | 1420                                                                                | 1720     | 1270 | 1300 | 45                                                                                   | B                                     |  | 195                                                                                   | 147 | 1/4 G | 6                           | B                                     | 28                                                                                    |
| 318 R4 (C) | 985      | 1115     | 985 | 985 | 390 | 292 | 480 | 1430                                                                                | 1730     | 1280 | 1310 | 45                                                                                   | B                                     |                                                                                       | 191                                                                                   | 195 | 147   | 1/4 G                       | 6                                     | B                                                                                     |

|            | V1 | V2  | V3  |  | V1 | V2 | V3 |  | E         |           |           |            |            |            |            |            |            |            |            |
|------------|----|-----|-----|-------------------------------------------------------------------------------------|----|----|----|-------------------------------------------------------------------------------------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|
|            |    |     |     |                                                                                     |    |    |    |                                                                                     | IEC<br>71 | IEC<br>80 | IEC<br>90 | IEC<br>100 | IEC<br>112 | IEC<br>132 | IEC<br>160 | IEC<br>180 | IEC<br>200 | IEC<br>225 | IEC<br>250 |
| 318 R4 (B) | 60 | 105 | 307 | 23                                                                                  |    |    |    |                                                                                     |           |           |           |            |            |            |            | 152        | 182        | 212        | 193        |
| 318 R4 (C) | 60 | 105 | 307 | 23                                                                                  |    |    |    |                                                                                     |           |           |           |            |            |            |            | 152        | 182        | 212        | 193        |

# 318L - 318R

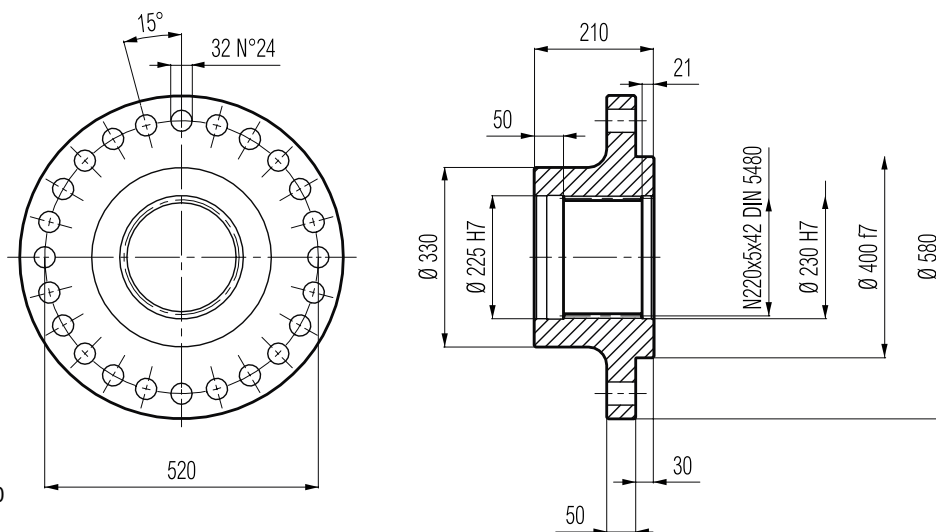
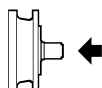


|             |                           |            |
|-------------|---------------------------|------------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 300 000 Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |            |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |            |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |            |

**Flangia / Flange**  
**Flansch / Brides**

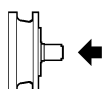
**318L - 318R**

**W0A**

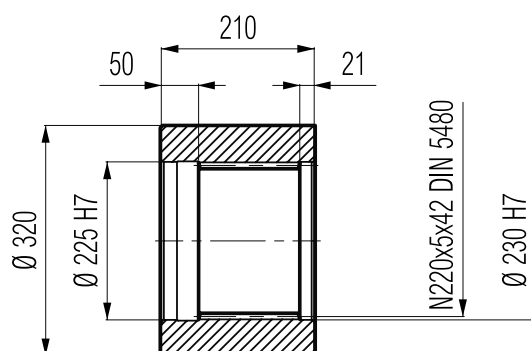


Materiale : Acciaio C40  
Material : Steel C40  
Material : Stahl C40  
Màterial : Acier C40

**Manicotti lisci / Sleeve couplings**  
**Naben / Manchons lisses a cannelure interieure**

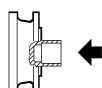


**M0A**

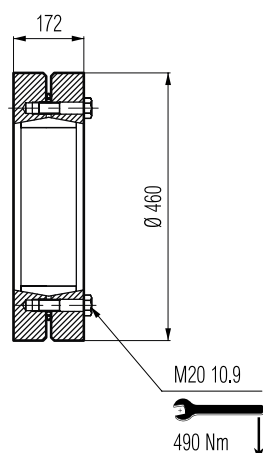


Materiale : Acciaio 16CrNi4  
Material : Steel 16CrNi4  
Material : Stahl 16CrNi4  
Màterial : Acier 16CrNi4

**Giunto ad attrito / Shrink disc**  
**Schrumpfscheibe / Frette de serrage**

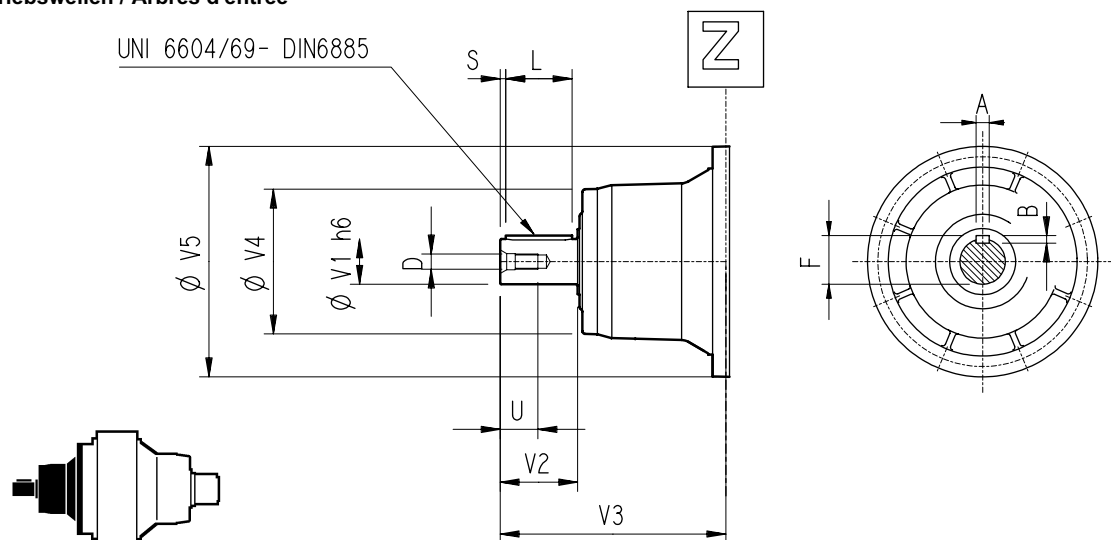


**G0A**



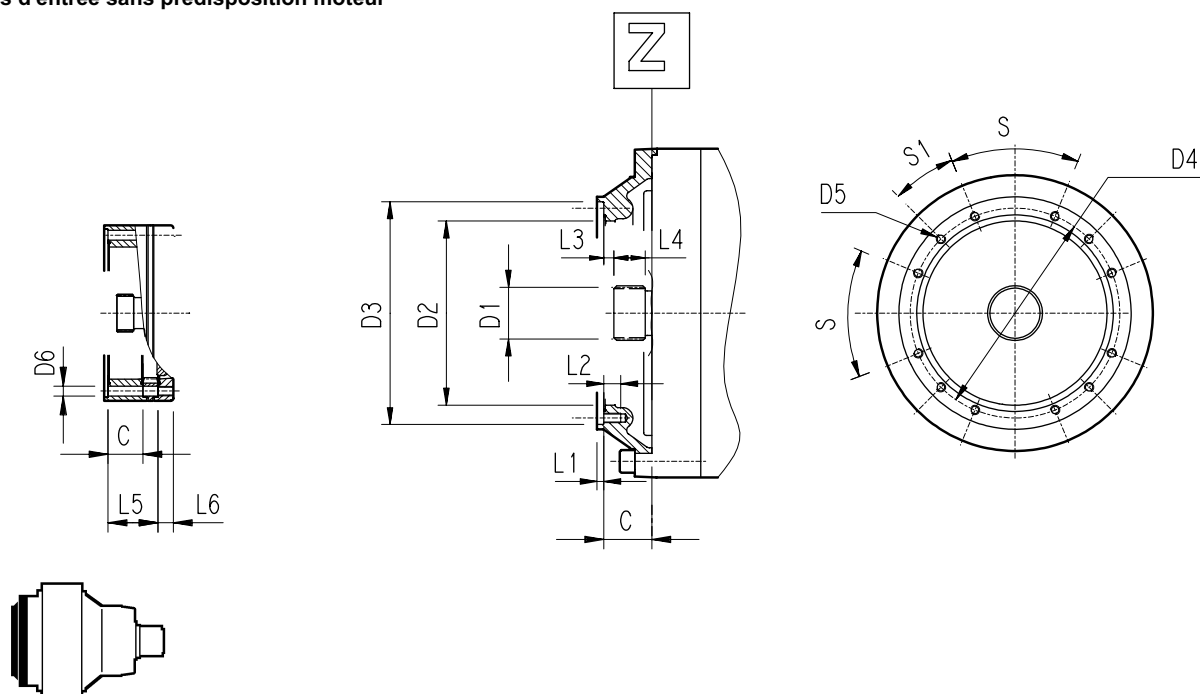
# 318L - 318R

Alberi veloci / Input shaft  
Antriebswellen / Arbres d'entrée



|                | CODE | V1 | V2  | V3  | V4  | V5  | A  | B  | F  | L   | S   | D   | U  |
|----------------|------|----|-----|-----|-----|-----|----|----|----|-----|-----|-----|----|
| 318 L3         | V11B | 80 | 130 | 348 | 200 | 428 | 22 | 14 | 85 | 110 | 10  | M16 | 36 |
| 318 L4         | V07B | 80 | 130 | 315 | 200 | 345 | 22 | 14 | 85 | 110 | 10  | M16 | 36 |
|                | V07A | 60 | 105 | 313 | 155 | 345 | 18 | 11 | 64 | 90  | 7.5 | M16 | 36 |
| 318 R4 (B) (C) | V06B | 60 | 105 | 307 | 155 | 292 | 18 | 11 | 64 | 90  | 7.5 | M16 | 36 |

Dimensioni d'entrata senza predisposizione motore  
Input dimension without motor adaptor  
Maße für den Antrieb ohne Motoradapter  
Dimensions d'entrée sans prédisposition moteur



|                | C   | D1              | D2  | D3     | D4  | D5        | D6 | L1 | L2 | L3  | L4 | L5 | L6 | S   | S1    | Entrata<br>Input<br>Antrieb<br>Entrée |
|----------------|-----|-----------------|-----|--------|-----|-----------|----|----|----|-----|----|----|----|-----|-------|---------------------------------------|
| 318 L1         |     |                 |     |        |     |           |    |    |    |     |    |    |    |     |       |                                       |
| 318 L2         | 116 | 100x94 DIN 5482 | 340 | 412 H7 | 390 | M16 n° 18 | /  | 7  | 30 | 8   | 55 | /  | /  | 20° | 20°   | E                                     |
| 318 L3         | 81  | 80x74 DIN 5482  | 270 | 335 H7 | 314 | M16 n° 8  | /  | 5  | 30 | 8.5 | 40 | /  | /  | 60° | 30°   | D                                     |
| 318 L4         | 51  | 58x53 DIN 5482  | 195 | 236 H7 | 222 | M16 n° 12 | /  | 4  | 18 | 11  | 22 | /  | /  | 45° | 22.5° | B                                     |
| 318 R4 (B) (C) | 45  | 58x53 DIN 5482  | 195 | 236 H7 | 222 | M10 n° 10 | /  | 4  | 18 | 11  | 22 | /  | /  | 45° | 22.5° | B                                     |

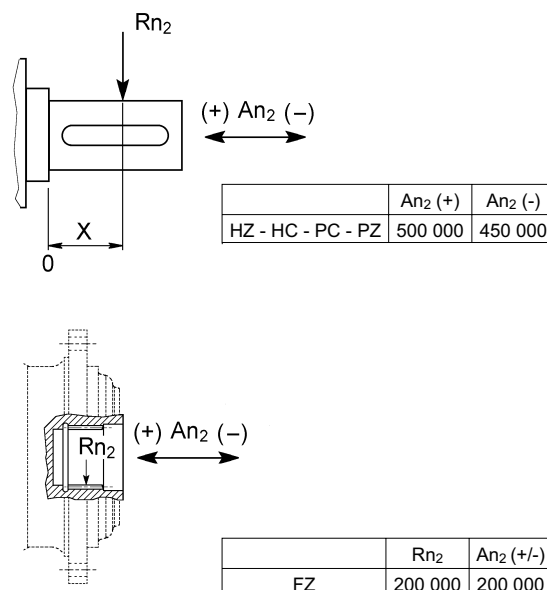
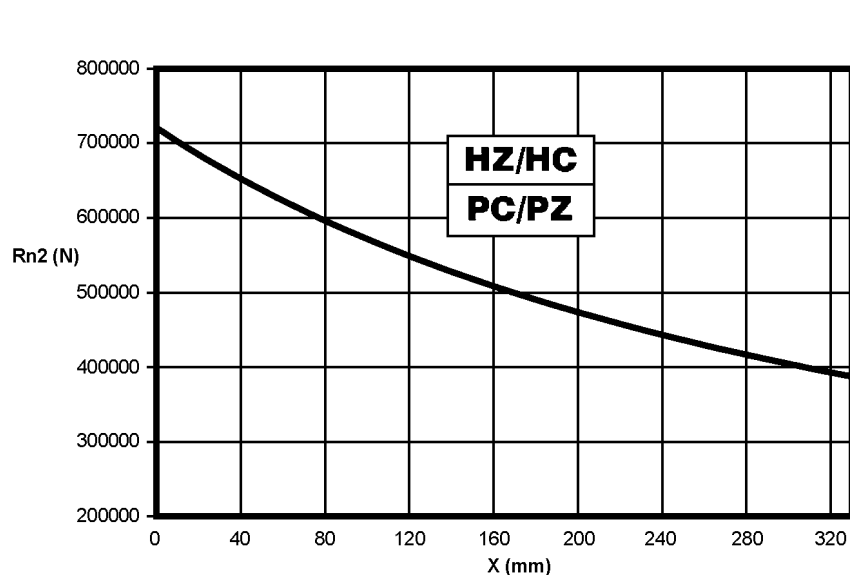
## 318L - 318R

Carichi radiali ed assiali ammissibili sull'albero lento per un valore di  $Fh_2 : n_2 \cdot h = 10\,000$

Permissible radial and axial loads on output shaft with  $Fh_2$   
 $n_2 \cdot h = 10\,000$

An der Ausgangswelle zulässige Radiallasten und Axialkräfte für einen Wert von  $Fh_2$   
 $n_2 \cdot h = 10\,000$

Charges radiales et axiales admises sur l'arbre lent pour une valeur de  $Fh_2 : n_2 \cdot h = 10\,000$



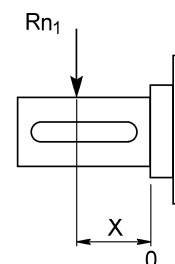
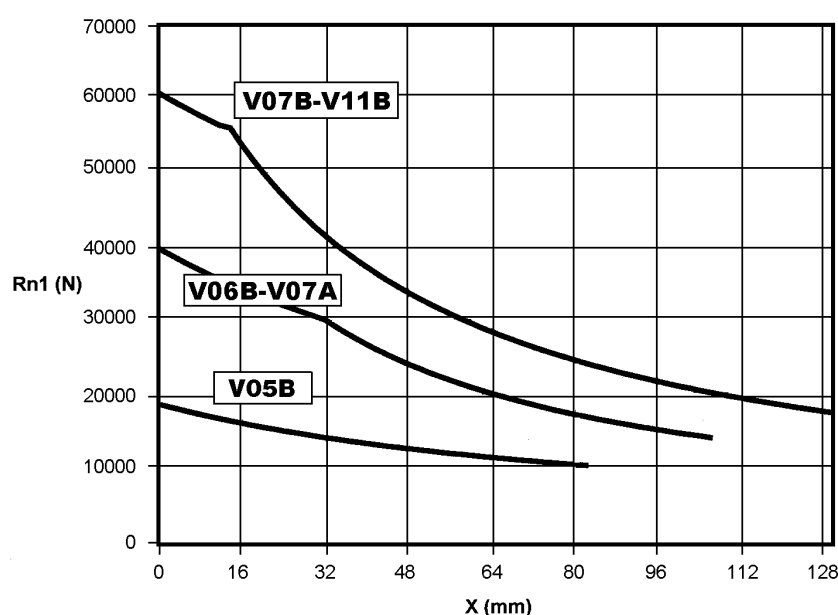
|                                                                                                                                                                                                                                                 |                                      |                   |        |        |        |         |         |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------|--------|--------|--------|---------|---------|-----------|
| Fattore fh <sub>2</sub> correttivo per carichi sugli alberi<br>Load corrective factor fh <sub>2</sub> on shafts<br>Korrektionsfaktor fh <sub>2</sub> für wellenbelastungen<br>Facteur de corréction fh <sub>2</sub> pour charges sur les arbres | Fh <sub>2</sub> = n <sub>2</sub> · h |                   | 10 000 | 25 000 | 50 000 | 100 000 | 500 000 | 1 000 000 |
|                                                                                                                                                                                                                                                 | fh <sub>2</sub>                      | FZ                | 1      | 0.74   | 0.58   | 0.46    | 0.27    | 0.21      |
|                                                                                                                                                                                                                                                 |                                      | HZ - HC - PC - PZ | 1      | 0.76   | 0.61   | 0.50    | 0.31    | 0.25      |

Carichi radiali ammissibili sull'albero veloce per un valore di  $Fh_1 : n_1 \cdot h = 250\,000$

Permissible radial loads on input shaft with  $Fh_1 : n_1 \cdot h = 250\,000$

An der Antriebswelle zulässige Radiallasten für einen Wert von  $Fh_1 : n_1 \cdot h = 250\,000$

Charges radiales admises sur l'arbre d'entrée pour une valeur de  $Fh_1 : n_1 \cdot h = 250\,000$



| Fattore fh1 correttivo per carichi sugli alberi<br>Load corrective factor fh1 on shafts<br>Korrektionsfaktor fh1 für wellenbelastungen<br>Facteur de corréction fh1 pour charges sur les arbres | Fh1 = n1 · h | 250 000 | 500 000 | 1 000 000 | 2 000 000 | 5 000 000 | 10 000 000 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------|---------|-----------|-----------|-----------|------------|
|                                                                                                                                                                                                 | fh1          | 1       | 0.79    | 0.63      | 0.50      | 0.37      | 0.29       |

# 319L

**M<sub>2</sub> = 300000 Nm**

|  | i     | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|-----------------------------------------------------------------------------------|-------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                   | 1:    | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>L1</b>                                                                         | 4.88  | 350 000              | 348 000           | 308 000           | 250 000           | 154 000           | 125 000           | 380            | 115            | 200                  | 300                  |                |                                                                                     |
|                                                                                   | 5.77  | 340 000              | 292 000           | 260 000           | 248 000           | 153 000           | 124 000           | 380            | 115            | 200                  | 300                  |                |                                                                                     |
| <b>L2</b>                                                                         | 19.9  | 350 000              | 348 000           | 308 000           | 250 000           | 154 000           | 125 000           | 250            | 70             | 350                  | 500                  |                |                                                                                     |
|                                                                                   | 23.6  | 340 000              | 291 000           | 260 000           | 248 000           | 153 000           | 124 000           | 250            | 70             | 350                  | 500                  |                |                                                                                     |
|                                                                                   | 25.6  | 350 000              | 348 000           | 286 000           | 233 000           | 144 000           | 117 000           | 250            | 70             | 350                  | 500                  |                |                                                                                     |
|                                                                                   | 30.4  | 307 000              | 296 000           | 241 000           | 196 000           | 121 000           | 98 000            | 250            | 70             | 350                  | 500                  |                |                                                                                     |
|                                                                                   | 35.9  | 340 000              | 292 000           | 260 000           | 220 000           | 136 000           | 110 000           | 250            | 70             | 350                  | 500                  |                |                                                                                     |
| <b>L3</b>                                                                         | 81.6  | 350 000              | 348 000           | 286 000           | 232 000           | 143 000           | 116 000           | 180            | 50             | 750                  | 1 000                |                |                                                                                     |
|                                                                                   | 105   | 350 000              | 348 000           | 301 000           | 245 000           | 151 000           | 123 000           | 180            | 50             | 750                  | 1 000                |                |                                                                                     |
|                                                                                   | 124   | 350 000              | 348 000           | 284 000           | 231 000           | 142 000           | 116 000           | 180            | 50             | 750                  | 1 000                | 3 200          | 6L                                                                                  |
|                                                                                   | 134   | 350 000              | 348 000           | 286 000           | 233 000           | 144 000           | 117 000           | 180            | 50             | 750                  | 1 000                | 2 600          | 6K                                                                                  |
|                                                                                   | 159   | 340 000              | 292 000           | 260 000           | 248 000           | 153 000           | 124 000           | 180            | 50             | 750                  | 1 000                | 2 600          | 6K                                                                                  |
|                                                                                   | 189   | 307 000              | 296 000           | 241 000           | 196 000           | 121 000           | 98 000            | 157            | 50             | 750                  | 1 000                | 2 100          | 6G                                                                                  |
|                                                                                   | 224   | 340 000              | 292 000           | 260 000           | 220 000           | 136 000           | 110 000           | 134            | 50             | 750                  | 1 000                | 2 100          | 6G                                                                                  |
| <b>L4</b>                                                                         | 334   | 350 000              | 348 000           | 286 000           | 232 000           | 143 000           | 116 000           | 100            | 30             | 1 500                | 2 500                | 1 100          | 6C                                                                                  |
|                                                                                   | 428   | 350 000              | 348 000           | 286 000           | 232 000           | 143 000           | 116 000           | 100            | 30             | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                   | 508   | 350 000              | 348 000           | 286 000           | 232 000           | 143 000           | 116 000           | 100            | 30             | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                   | 550   | 350 000              | 348 000           | 301 000           | 245 000           | 151 000           | 123 000           | 100            | 30             | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                   | 652   | 350 000              | 348 000           | 301 000           | 245 000           | 151 000           | 123 000           | 95             | 30             | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                   | 705   | 350 000              | 348 000           | 286 000           | 233 000           | 144 000           | 117 000           | 88             | 30             | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                   | 837   | 350 000              | 348 000           | 286 000           | 233 000           | 144 000           | 117 000           | 74             | 30             | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                   | 916   | 340 000              | 292 000           | 260 000           | 220 000           | 136 000           | 110 000           | 68             | 30             | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                   | 991   | 340 000              | 292 000           | 260 000           | 248 000           | 153 000           | 124 000           | 63             | 30             | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                   | 1 179 | 307 000              | 296 000           | 241 000           | 196 000           | 121 000           | 98 000            | 53             | 30             | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                   | 1 396 | 340 000              | 292 000           | 260 000           | 220 000           | 136 000           | 110 000           | 44             | 30             | 1 500                | 2 500                | 850            | 6B                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

# M<sub>2</sub> = 300000 Nm

# 319R

|  | i   | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|----------------------------------------------------------------------------------|-----|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                  |     | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h |                |                |                      |                      |                |                                                                                     |
|                                                                                  | 1:  | 10 000               | 25 000            | 50 000            | 100 000           | 500 000           | 1 000 000         | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>R4 (A)</b>                                                                    | 354 | 238 000              | 181 000           | 147 000           | 119 000           | 74 000            | 60 000            | 135            | 95             | 1 500                | 2 500                | 800            | 5G                                                                                  |
|                                                                                  | 454 | 284 000              | 215 000           | 175 000           | 142 000           | 88 000            | 71 000            | 135            | 95             | 1 500                | 2 500                | 800            | 5G                                                                                  |
|                                                                                  | 538 | 320 000              | 243 000           | 197 000           | 160 000           | 99 000            | 80 000            | 115            | 95             | 1 500                | 2 500                | 800            | 5G                                                                                  |
|                                                                                  | 582 | 338 000              | 257 000           | 208 000           | 169 000           | 104 000           | 85 000            | 107            | 95             | 1 500                | 2 500                | 630            | 5E                                                                                  |
|                                                                                  | 689 | 340 000              | 289 000           | 234 000           | 190 000           | 118 000           | 95 000            | 90             | 95             | 1 500                | 2 500                | 630            | 5E                                                                                  |
|                                                                                  | 820 | 307 000              | 296 000           | 241 000           | 196 000           | 121 000           | 98 000            | 76             | 95             | 1 500                | 2 500                | 500            | 5C                                                                                  |
|                                                                                  | 971 | 340 000              | 292 000           | 260 000           | 222 000           | 137 000           | 111 000           | 65             | 95             | 1 500                | 2 500                | 500            | 5C                                                                                  |
| <b>R4 (B)</b>                                                                    | 240 | 350 000              | 289 000           | 232 000           | 187 000           | 112 000           | 91 000            | 150            | 95             | 1 500                | 2 500                | 2 100          | 6G                                                                                  |
|                                                                                  | 308 | 350 000              | 345 000           | 283 000           | 226 000           | 136 000           | 112 000           | 150            | 95             | 1 500                | 2 500                | 1 500          | 6E                                                                                  |
|                                                                                  | 365 | 350 000              | 348 000           | 284 000           | 231 000           | 142 000           | 116 000           | 150            | 95             | 1 500                | 2 500                | 1 500          | 6E                                                                                  |
|                                                                                  | 395 | 350 000              | 348 000           | 286 000           | 233 000           | 144 000           | 117 000           | 150            | 95             | 1 500                | 2 500                | 1 500          | 6E                                                                                  |
|                                                                                  | 468 | 340 000              | 292 000           | 260 000           | 248 000           | 153 000           | 124 000           | 130            | 95             | 1 500                | 2 500                | 1 100          | 6C                                                                                  |
|                                                                                  | 556 | 307 000              | 296 000           | 241 000           | 196 000           | 121 000           | 98 000            | 98             | 95             | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                  | 658 | 340 000              | 292 000           | 260 000           | 220 000           | 136 000           | 110 000           | 92             | 95             | 1 500                | 2 500                | 850            | 6B                                                                                  |
| <b>R4 (C)</b>                                                                    | 332 | 281 000              | 216 000           | 177 000           | 144 000           | 90 000            | 72 000            | 150            | 115            | 1 500                | 2 500                | 1 100          | 6C                                                                                  |
|                                                                                  | 426 | 343 000              | 255 000           | 208 000           | 171 000           | 106 000           | 87 000            | 147            | 115            | 1 500                | 2 500                | 1 100          | 6C                                                                                  |
|                                                                                  | 505 | 350 000              | 291 000           | 236 000           | 193 000           | 118 000           | 98 000            | 124            | 115            | 1 500                | 2 500                | 1 100          | 6C                                                                                  |
|                                                                                  | 546 | 350 000              | 303 000           | 250 000           | 202 000           | 125 000           | 102 000           | 114            | 115            | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                  | 647 | 340 000              | 292 000           | 260 000           | 225 000           | 140 000           | 115 000           | 94             | 115            | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                  | 770 | 307 000              | 296 000           | 241 000           | 196 000           | 121 000           | 98 000            | 72             | 115            | 1 500                | 2 500                | 850            | 6B                                                                                  |
|                                                                                  | 911 | 340 000              | 292 000           | 260 000           | 220 000           | 136 000           | 110 000           | 67             | 115            | 1 500                | 2 500                | 850            | 6B                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

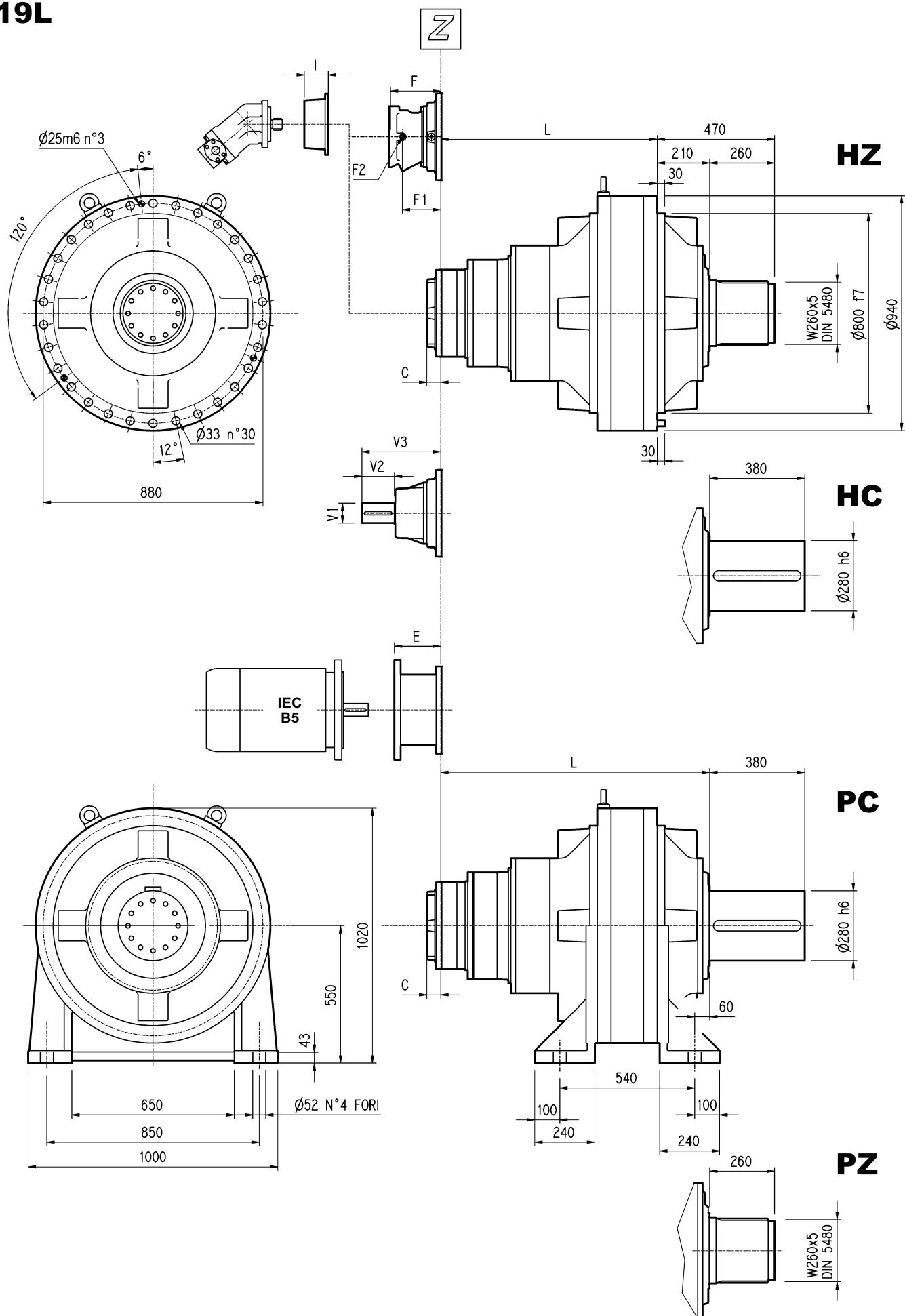
Nota: i contrassegni (A) (B) (C) sulla stessa grandezza, indicano riduzioni angolari di dimensioni differenti: vedere le pagine dimensionali.

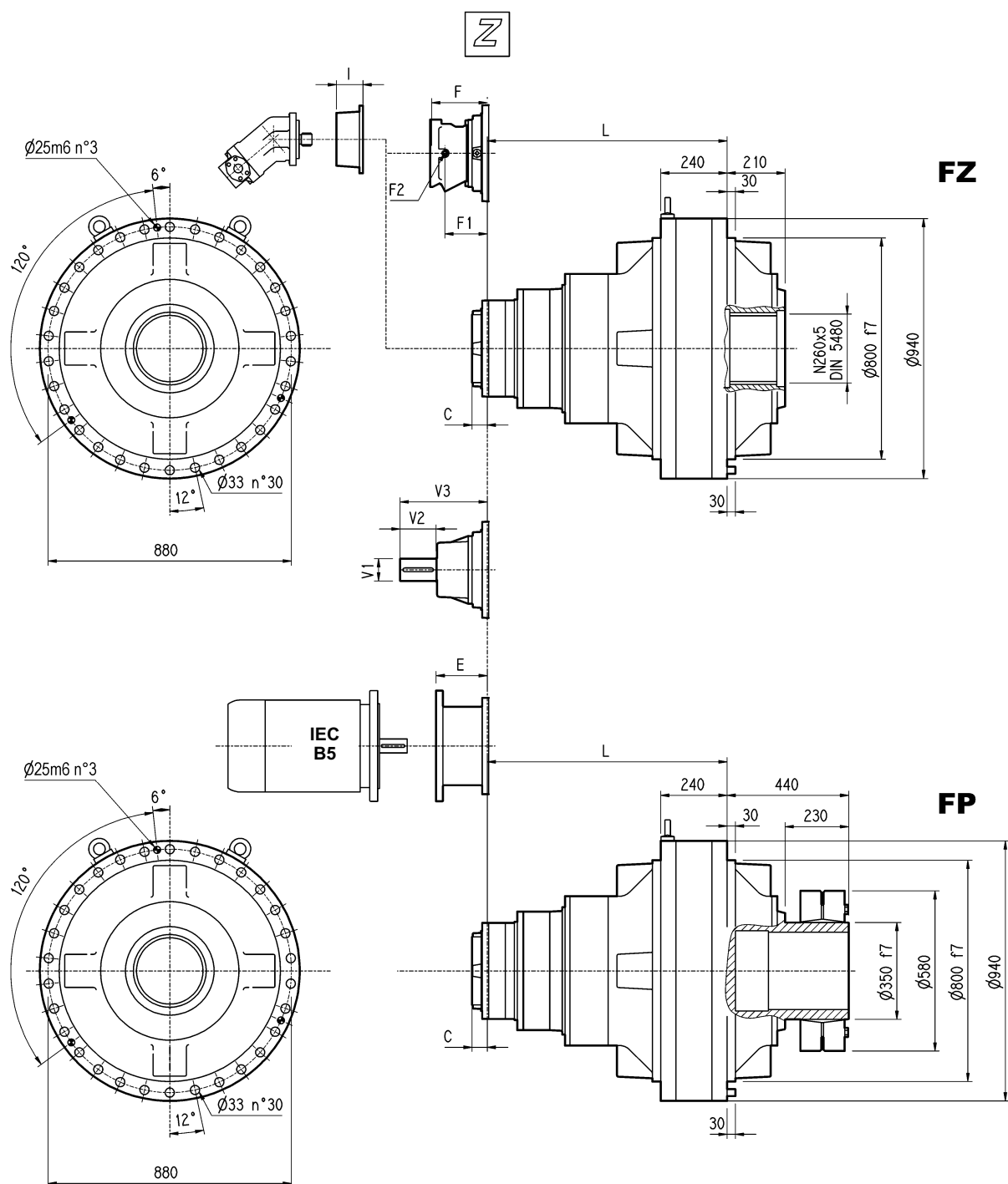
Note: Letters (A) (B) (C) near size indication identify different angle reduction dimensions. See pages relevant to dimensions.

Hinweis: Die Kennzeichnungen (A) (B) (C) an der gleichen Baugröße weisen auf die Winkelreduzierung in unterschiedlichen Maßen hin: siehe Seiten mit Maßtabellen.

Remarque : les indications (A) (B) (C) sur la même taille indique des réductions angulaires de dimensions différentes. Se reporter aux pages des dimensions.

## 319L



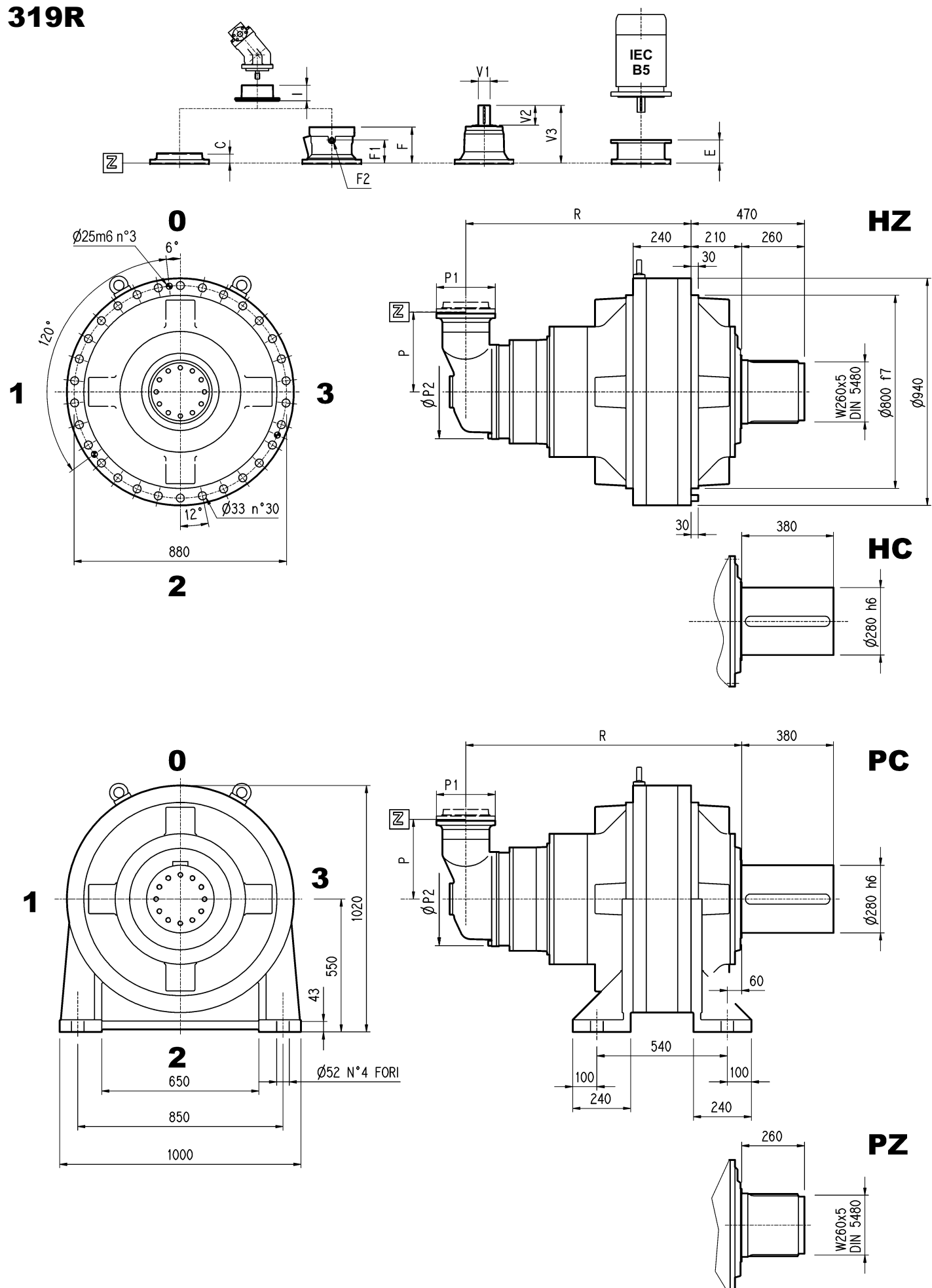


|             |                           |               |
|-------------|---------------------------|---------------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 420 000<br>Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |               |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |               |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |               |

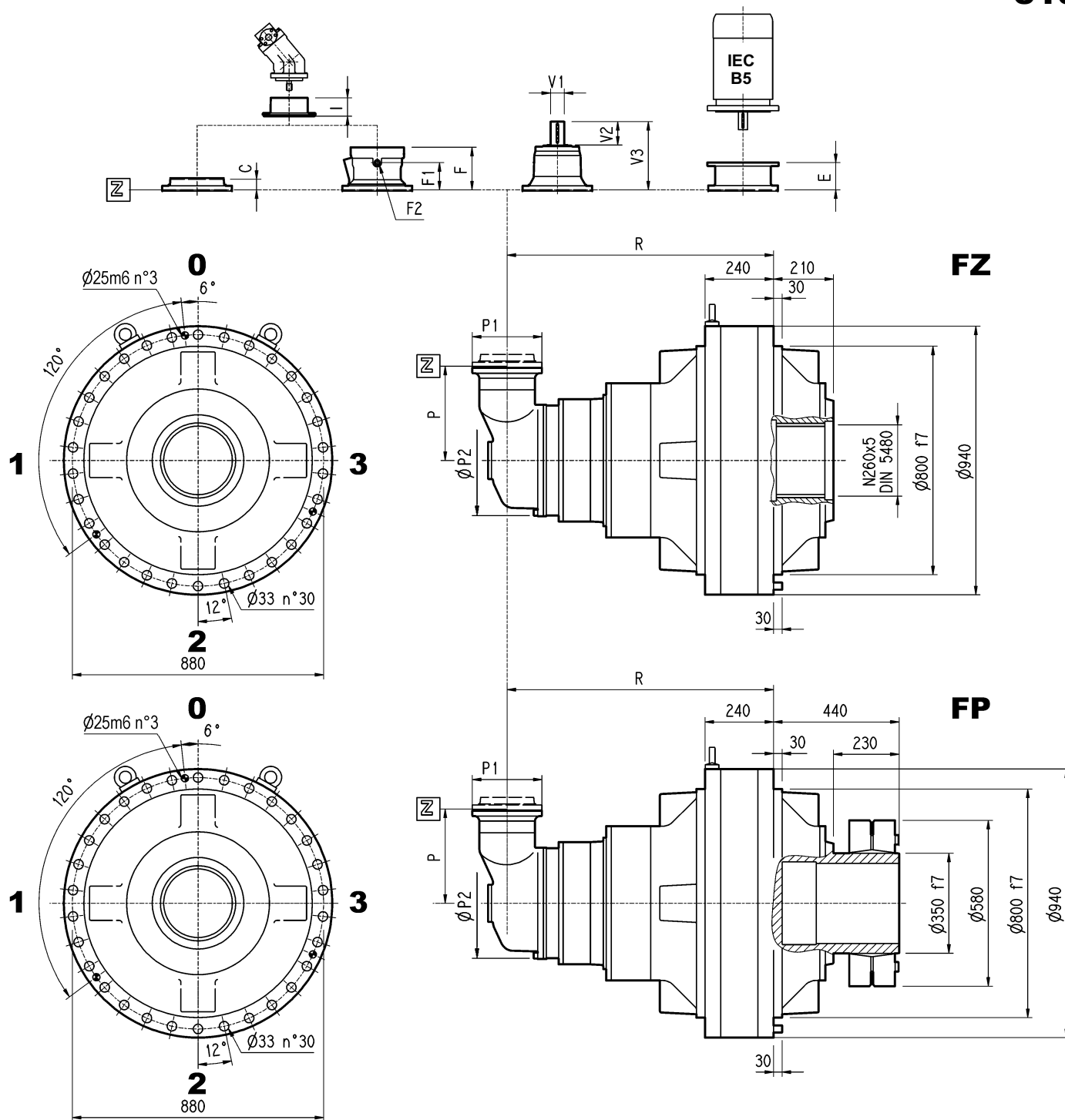
|        | L        |          |     |     |  |          |       |       |  |                                       |  |  |     |     |                             |                                       |                                                                                       |    |
|--------|----------|----------|-----|-----|-------------------------------------------------------------------------------------|----------|-------|-------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-----|-----------------------------|---------------------------------------|---------------------------------------------------------------------------------------|----|
|        | HZ<br>HC | PC<br>PZ | FZ  | FP  | HZ<br>HC                                                                            | PC<br>PZ | FZ    | FP    | C                                                                                   | Entrata<br>Input<br>Antrieb<br>Entrée | I                                                                                     | F                                                                                     | F1  | F2  | Tipo<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |  |    |
| 319 L1 | 185      | 395      | 185 | 185 | 1 800                                                                               | 2 100    | 1 700 | 1 700 | 245                                                                                 |                                       |  |                                                                                       |     |     |                             |                                       |                                                                                       |    |
| 319 L2 | 568      | 778      | 568 | 568 | 2 050                                                                               | 2 350    | 1 950 | 1 950 | 116                                                                                 | E                                     |                                                                                       |                                                                                       |     |     |                             |                                       |                                                                                       |    |
| 319 L3 | 780      | 990      | 780 | 780 | 2 135                                                                               | 2 435    | 2 035 | 2 035 | 81                                                                                  | D                                     |                                                                                       |                                                                                       | 232 | 185 | 1/4 G                       | 6                                     | B                                                                                     | 28 |
| 319 L4 | 913      | 1 123    | 913 | 913 | 2 180                                                                               | 2 480    | 2 080 | 2 080 | 51                                                                                  | R                                     |                                                                                       | 191                                                                                   | 201 | 153 | 1/4 G                       | 6                                     | B                                                                                     | 28 |

|        | V1 | V2  | V3  | Kg | V1 | V2  | V3  | Kg | E |  |  |  | IEC<br>180 | IEC<br>200 | IEC<br>225 | IEC<br>250 |
|--------|----|-----|-----|----|----|-----|-----|----|---|--|--|--|------------|------------|------------|------------|
|        |    |     |     |    |    |     |     |    |   |  |  |  |            |            |            |            |
| 319 L1 |    |     |     |    |    |     |     |    |   |  |  |  |            |            |            |            |
| 319 L2 |    |     |     |    |    |     |     |    |   |  |  |  |            |            |            |            |
| 319 L3 | 80 | 130 | 348 | 35 |    |     |     |    |   |  |  |  |            |            |            |            |
| 319 L4 | 80 | 130 | 315 | 35 | 60 | 105 | 313 | 28 |   |  |  |  | 195        | 186        | 216        | 215        |

**319R**



# 319R

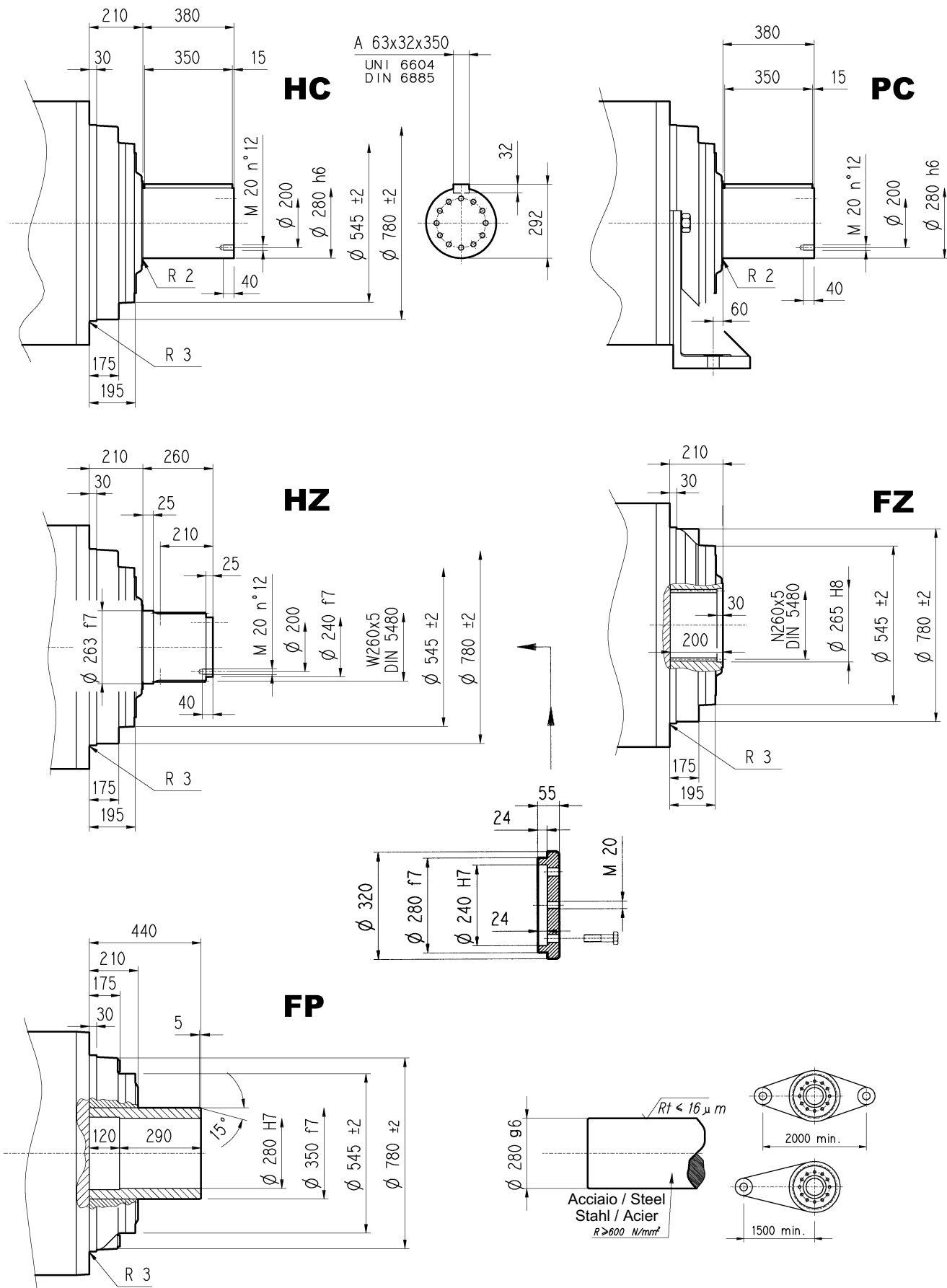


|             |                           |         |
|-------------|---------------------------|---------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 420 000 |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE | Nm      |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |         |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |         |

|            | R        |          |      |      | P   | P1  | P2  |  |          |      |      |  |                                       |  |  |     |       |                     |                                       |                                                                                       |
|------------|----------|----------|------|------|-----|-----|-----|-------------------------------------------------------------------------------------|----------|------|------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-------|---------------------|---------------------------------------|---------------------------------------------------------------------------------------|
|            | HZ<br>HC | PC<br>PZ | FZ   | FP   |     |     |     | HZ<br>HC                                                                            | PC<br>PZ | FZ   | FP   | C                                                                                   | Entrata<br>Input<br>Antrieb<br>Entrée | I                                                                                     | F                                                                                     | F1  | F2    | Tipo<br>Type<br>Typ | Entrata<br>Input<br>Antrieb<br>Entrée |  |
| 319 R4 (B) | 1005     | 1205     | 1005 | 1005 | 345 | 262 | 400 | 2260                                                                                | 2560     | 2160 | 2160 | 45                                                                                  | B                                     |  | 195                                                                                   | 147 | 1/4 G | 6                   | B                                     | 28                                                                                    |
| 319 R4 (C) | 1005     | 1205     | 1005 | 1005 | 390 | 262 | 480 | 2280                                                                                | 2580     | 2180 | 2180 | 45                                                                                  | B                                     |                                                                                       | 195                                                                                   | 147 | 1/4 G | 6                   | B                                     | 28                                                                                    |
| 319 R4 (A) | 1005     | 1205     | 1005 | 1005 | 330 | 245 | 390 | 2245                                                                                | 2545     | 2145 | 2145 | 37                                                                                  | A                                     |                                                                                       | 191                                                                                   | 145 | 95    | 1/4 G               | 5                                     | A                                                                                     |

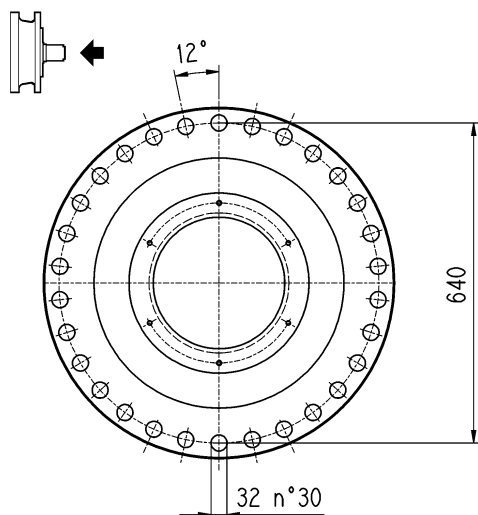
|            | V1 | V2  | V3  |  | V1 | V2 | V3 |  | E      |        |        |        |         |         |         |         |         |         |         |         |
|------------|----|-----|-----|-------------------------------------------------------------------------------------|----|----|----|-------------------------------------------------------------------------------------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
|            |    |     |     |                                                                                     |    |    |    |                                                                                     | IEC 63 | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 | IEC 200 | IEC 225 | IEC 250 |
| 319 R4 (B) | 60 | 105 | 307 | 23                                                                                  |    |    |    |                                                                                     |        |        |        |        |         |         |         |         | 152     | 182     | 212     | 193     |
| 319 R4 (C) | 60 | 105 | 307 | 23                                                                                  |    |    |    |                                                                                     |        |        |        |        |         |         |         |         | 152     | 182     | 212     | 193     |
| 319 R4 (A) | 48 | 82  | 239 | 15                                                                                  |    |    |    |                                                                                     |        |        |        |        |         | 114     | 144     | 144     | 174     |         |         |         |

# 319L - 319R



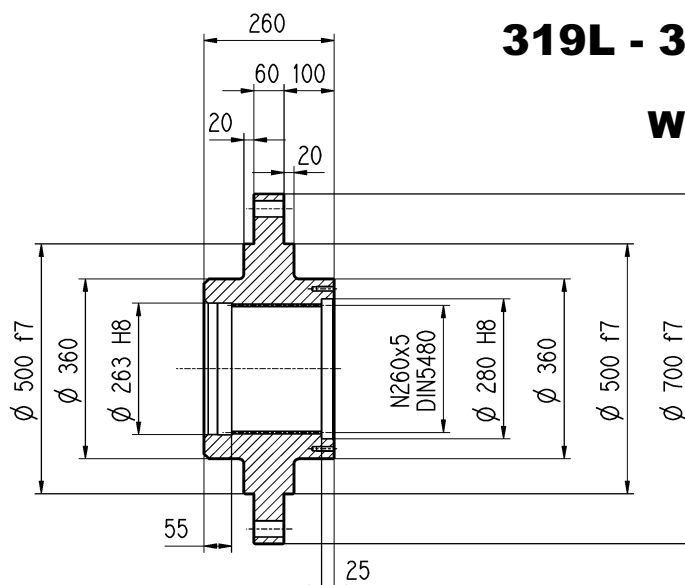
|             |                           |         |
|-------------|---------------------------|---------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 420 000 |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE | Nm      |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |         |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |         |

**Flangia / Flange**  
**Flansch / Brides**



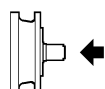
**319L - 319R**

**W0A**

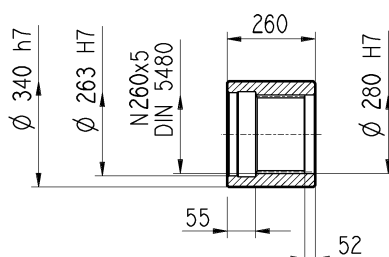


Materiale : Acciaio C40  
Material : Steel C40  
Material : Stahl C40  
Màterial : Acier C40

**Manicotti lisci / Sleeve couplings**  
**Naben / Manchons lisses a cannelure interieure**



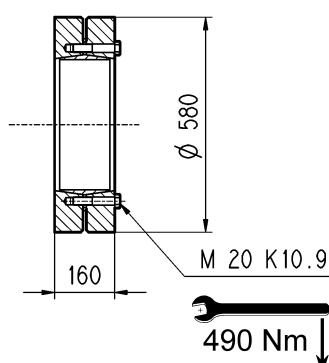
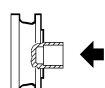
**M0A**



Materiale : Acciaio 16CrNi4  
Material : Steel 16CrNi4  
Material : Stahl 16CrNi4  
Màterial : Acier 16CrNi4

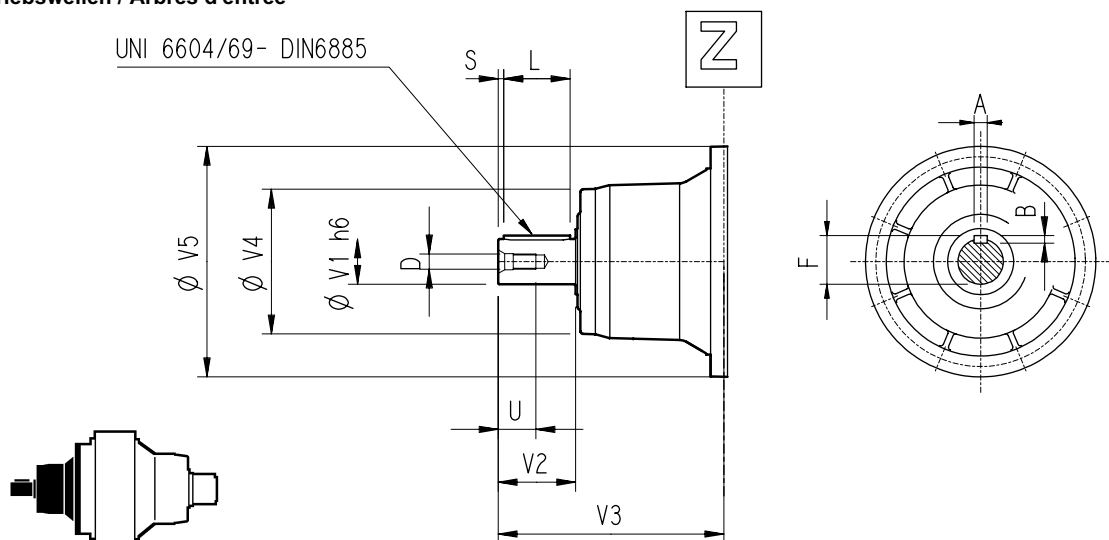
**Giunto ad attrito / Shrink disc**  
**Schrumpfscheibe / Frette de serrage**

**G0A**



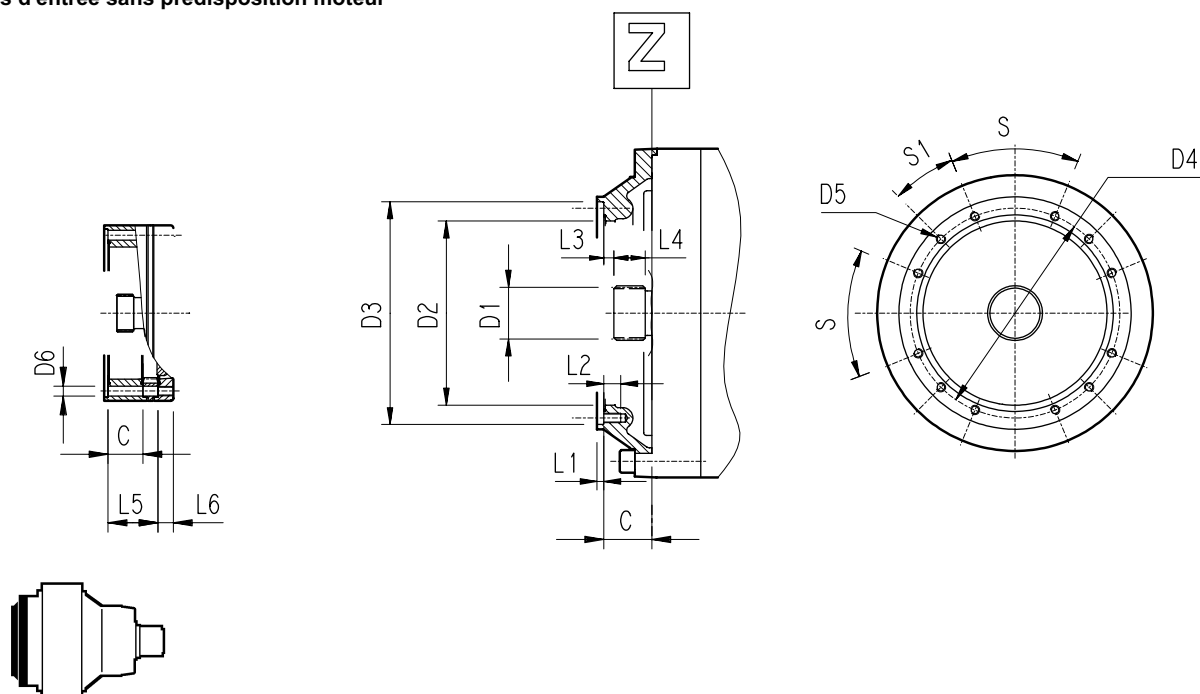
# 319L - 319R

Alberi veloci / Input shaft  
Antriebswellen / Arbres d'entrée



|                | CODE | V1 | V2  | V3  | V4  | V5  | A  | B  | F    | L   | S   | D   | U  |
|----------------|------|----|-----|-----|-----|-----|----|----|------|-----|-----|-----|----|
| 319 L3         | V11B | 80 | 130 | 348 | 200 | 428 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
| 319 L4         | V07B | 80 | 130 | 315 | 200 | 345 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
|                | V07A | 60 | 105 | 313 | 155 | 345 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |
| 319 R4 (A)     | V05B | 48 | 82  | 239 | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 319 R4 (B) (C) | V06B | 60 | 105 | 307 | 155 | 292 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |

Dimensioni d'entrata senza predisposizione motore  
Input dimension without motor adaptor  
Maße für den Antrieb ohne Motoradapter  
Dimensions d'entrée sans prédisposition moteur



|                | C   | D1              | D2  | D3     | D4  | D5       | D6 | L1 | L2 | L3  | L4 | L5 | L6 | S   | S1    | Entrata<br>Input<br>Antrieb<br>Entrée |
|----------------|-----|-----------------|-----|--------|-----|----------|----|----|----|-----|----|----|----|-----|-------|---------------------------------------|
| 319 L1         |     |                 |     |        |     |          |    |    |    |     |    |    |    |     |       |                                       |
| 319 L2         | 116 | 100x94 DIN 5482 | 340 | 412 H7 | 390 | M16 n°18 | /  | 7  | 30 | 8   | 55 | /  | /  | 20° | 20°   | E                                     |
| 319 L3         | 81  | 80x74 DIN 5482  | 270 | 335 H7 | 314 | M16 n°8  | /  | 5  | 30 | 8.5 | 40 | /  | /  | 60° | 30°   | D                                     |
| 319 L4         | 51  | 58x53 DIN 5482  | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11  | 22 | /  | /  | 45° | 22.5° | B                                     |
| 319 R4 (A)     | 37  | 40x36 DIN 5482  | 140 | 178 H7 | 165 | M12 n°8  | 11 | 4  | 18 | 9   | 18 | 0  | 0  | 45° | 45°   | A                                     |
| 319 R4 (B) (C) | 45  | 58x53 DIN 5482  | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11  | 22 | /  | /  | 45° | 22.5° | B                                     |

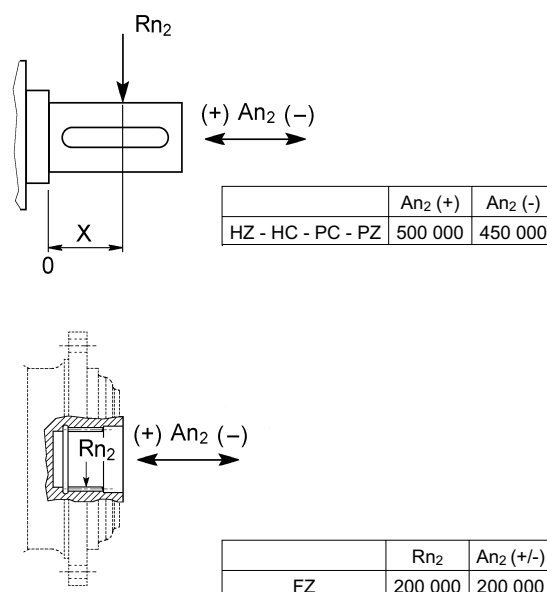
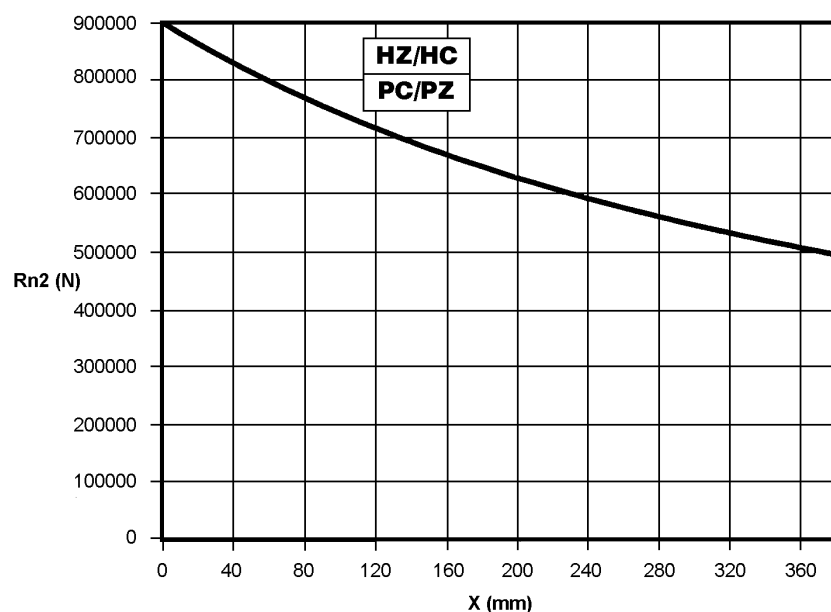
## 319L - 319R

Carichi radiali ed assiali ammissibili sull'albero lento per un valore di  $Fh_2 : n_2 \cdot h = 10\,000$

Permissible radial and axial loads on output shaft with  $Fh_2 : n_2 \cdot h = 10\,000$

An der Ausgangswelle zulässige Radiallasten und Axialkräfte für einen Wert von  $Fh_2 : n_2 \cdot h = 10\,000$

Charges radiales et axiales admissibles sur l'arbre lent pour une valeur de  $Fh_2 : n_2 \cdot h = 10\,000$



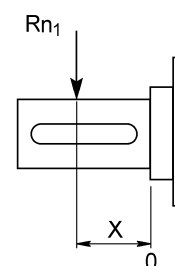
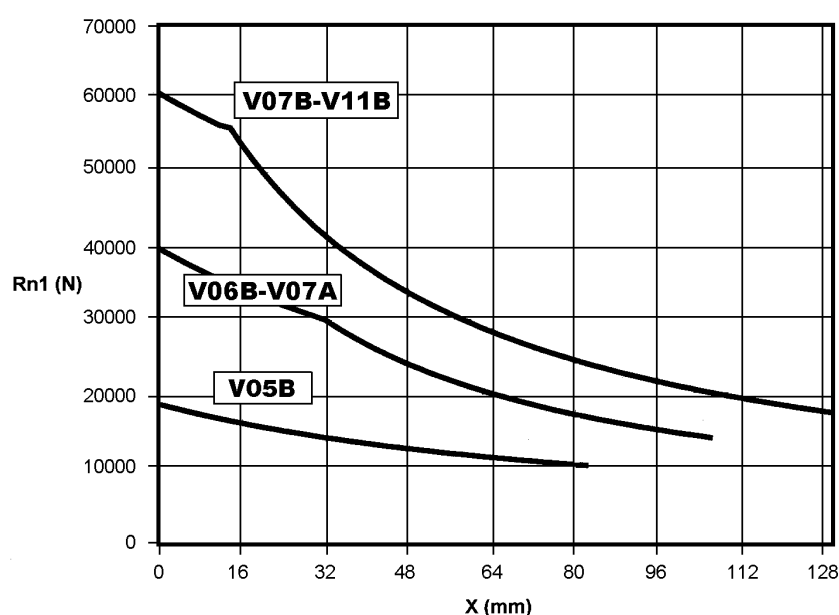
| Fattore $fh_2$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_2$ on shafts<br>Korrektionsfaktor $fh_2$ für wellenbelastungen<br>Facteur de correction $fh_2$ pour charges sur les arbres | $Fh_2 = n_2 \cdot h$ |                   |        |        |         |         |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|--------|--------|---------|---------|-----------|
|                                                                                                                                                                                                             | $fh_2$               | 10 000            | 25 000 | 50 000 | 100 000 | 500 000 | 1 000 000 |
|                                                                                                                                                                                                             |                      | FZ                | 0.74   | 0.58   | 0.46    | 0.27    | 0.21      |
|                                                                                                                                                                                                             |                      | HZ - HC - PC - PZ | 0.76   | 0.61   | 0.50    | 0.31    | 0.25      |

Carichi radiali ammissibili sull'albero veloce per un valore di  $Fh_1 : n_1 \cdot h = 250\,000$

Permissible radial loads on input shaft with  $Fh_1 : n_1 \cdot h = 250\,000$

An der Antriebswelle zulässige Radiallasten für einen Wert von  $Fh_1 : n_1 \cdot h = 250\,000$

Charges radiales admises sur l'arbre d'entrée pour une valeur de  $Fh_1 : n_1 \cdot h = 250\,000$



| Fattore $fh_1$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_1$ on shafts<br>Korrektionsfaktor $fh_1$ für wellenbelastungen<br>Facteur de correction $fh_1$ pour charges sur les arbres | $Fh_1 = n_1 \cdot h$ | 250 000 | 500 000 | 1 000 000 | 2 000 000 | 5 000 000 | 10 000 000 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|---------|-----------|-----------|-----------|------------|
|                                                                                                                                                                                                             | $fh_1$               | 1       | 0.79    | 0.63      | 0.50      | 0.37      | 0.29       |

# 321L

**M<sub>2</sub> = 450000 Nm**

|  | i     | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|-----------------------------------------------------------------------------------|-------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                   |       | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h |                |                |                      |                      |                |                                                                                     |
|                                                                                   | 1:    | 10 000               | 25 000            | 50 000            | 100 000           | 500 000           | 1 000 000         | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>L1</b>                                                                         | 4.44  | 540 000              | 466 000           | 415 000           | 337 000           | 208 000           | 169 000           | 540            | 115            | 200                  | 300                  |                |                                                                                     |
| <b>L2</b>                                                                         | 18.2  | 540 000              | 466 000           | 415 000           | 337 000           | 208 000           | 169 000           | 350            | 95             | 200                  | 300                  |                |                                                                                     |
|                                                                                   | 23.3  | 540 000              | 460 000           | 410 000           | 335 000           | 210 000           | 172 000           | 350            | 95             | 200                  | 300                  |                |                                                                                     |
|                                                                                   | 27.7  | 498 000              | 466 000           | 415 000           | 337 000           | 208 000           | 169 000           | 350            | 95             | 200                  | 300                  |                |                                                                                     |
| <b>L3</b>                                                                         | 75.3  | 540 000              | 466 000           | 406 000           | 329 000           | 203 000           | 165 000           | 200            | 60             | 500                  | 800                  |                |                                                                                     |
|                                                                                   | 98.2  | 540 000              | 466 000           | 397 000           | 322 000           | 199 000           | 162 000           | 200            | 60             | 500                  | 800                  |                |                                                                                     |
|                                                                                   | 118   | 540 000              | 466 000           | 396 000           | 322 000           | 199 000           | 161 000           | 200            | 60             | 500                  | 800                  |                |                                                                                     |
|                                                                                   | 126   | 540 000              | 460 000           | 410 000           | 335 000           | 210 000           | 172 000           | 200            | 60             | 500                  | 800                  |                |                                                                                     |
|                                                                                   | 152   | 540 000              | 460 000           | 410 000           | 335 000           | 210 000           | 172 000           | 200            | 60             | 500                  | 800                  |                |                                                                                     |
|                                                                                   | 180   | 498 000              | 466 000           | 415 000           | 337 000           | 208 000           | 169 000           | 180            | 60             | 500                  | 800                  |                |                                                                                     |
| <b>L4</b>                                                                         | 258   | 540 000              | 466 000           | 406 000           | 329 000           | 203 000           | 165 000           | 130            | 35             | 1 400                | 2 000                | 2 100          | 6G                                                                                  |
|                                                                                   | 308   | 540 000              | 466 000           | 390 000           | 316 000           | 195 000           | 159 000           | 130            | 35             | 1 400                | 2 000                | 2 100          | 6G                                                                                  |
|                                                                                   | 395   | 540 000              | 466 000           | 401 000           | 325 000           | 201 000           | 163 000           | 130            | 35             | 1 400                | 2 000                | 2 100          | 6G                                                                                  |
|                                                                                   | 469   | 540 000              | 466 000           | 391 000           | 318 000           | 196 000           | 159 000           | 130            | 35             | 1 400                | 2 000                | 1 500          | 6E                                                                                  |
|                                                                                   | 515   | 540 000              | 466 000           | 397 000           | 322 000           | 199 000           | 162 000           | 130            | 35             | 1 400                | 2 000                | 1 500          | 6E                                                                                  |
|                                                                                   | 612   | 540 000              | 466 000           | 397 000           | 322 000           | 199 000           | 162 000           | 130            | 35             | 1 400                | 2 000                | 1 100          | 6C                                                                                  |
|                                                                                   | 736   | 540 000              | 466 000           | 396 000           | 322 000           | 199 000           | 161 000           | 130            | 35             | 1 400                | 2 000                | 850            | 6B                                                                                  |
|                                                                                   | 796   | 540 000              | 460 000           | 410 000           | 335 000           | 210 000           | 172 000           | 123            | 35             | 1 400                | 2 000                | 850            | 6B                                                                                  |
|                                                                                   | 945   | 540 000              | 460 000           | 410 000           | 335 000           | 210 000           | 172 000           | 103            | 35             | 1 400                | 2 000                | 850            | 6B                                                                                  |
|                                                                                   | 1 122 | 498 000              | 466 000           | 415 000           | 337 000           | 208 000           | 169 000           | 87             | 35             | 1 400                | 2 000                | 850            | 6B                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

**M<sub>2</sub> = 450000 Nm**

**321R**

|  | i   | M <sub>n2</sub> [Nm] |                   |                   |                   |                   |                   | P <sub>1</sub> | P <sub>t</sub> | n <sub>1</sub>       | n <sub>1max</sub>    | M <sub>b</sub> |  |
|----------------------------------------------------------------------------------|-----|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------|----------------|----------------------|----------------------|----------------|-------------------------------------------------------------------------------------|
|                                                                                  |     | n <sub>2</sub> ·h    | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h | n <sub>2</sub> ·h |                |                |                      |                      |                |                                                                                     |
|                                                                                  | 1:  | 10 000               | 25 000            | 50 000            | 100 000           | 500 000           | 1 000 000         | [kW]           | [kW]           | [min <sup>-1</sup> ] | [min <sup>-1</sup> ] | [Nm]           |                                                                                     |
| <b>R4 (A)</b>                                                                    | 326 | 225 000              | 171 000           | 139 000           | 113 000           | 70 000            | 57 000            | 135            | 105            | 1 400                | 2 000                | 800            | 5G                                                                                  |
|                                                                                  | 425 | 270 000              | 206 000           | 167 000           | 136 000           | 84 000            | 68 000            | 135            | 105            | 1 400                | 2 000                | 800            | 5G                                                                                  |
|                                                                                  | 512 | 309 000              | 234 000           | 190 000           | 155 000           | 95 000            | 78 000            | 135            | 105            | 1 400                | 2 000                | 800            | 5G                                                                                  |
|                                                                                  | 546 | 323 000              | 245 000           | 199 000           | 165 000           | 102 000           | 83 000            | 135            | 105            | 1 400                | 2 000                | 800            | 5G                                                                                  |
|                                                                                  | 657 | 368 000              | 277 000           | 229 000           | 185 000           | 116 000           | 94 000            | 135            | 105            | 1 400                | 2 000                | 800            | 5G                                                                                  |
|                                                                                  | 780 | 414 000              | 315 000           | 256 000           | 208 000           | 128 000           | 104 000           | 125            | 105            | 1 400                | 2 000                | 800            | 5G                                                                                  |
| <b>R4 (B)</b>                                                                    | 221 | 362 000              | 282 000           | 228 000           | 183 000           | 110 000           | 89 000            | 150            | 105            | 1 400                | 2 000                | 2 100          | 6G                                                                                  |
|                                                                                  | 289 | 434 000              | 329 000           | 260 000           | 208 000           | 125 000           | 104 000           | 150            | 105            | 1 400                | 2 000                | 2 100          | 6G                                                                                  |
|                                                                                  | 347 | 491 000              | 365 000           | 297 000           | 240 000           | 146 000           | 120 000           | 150            | 105            | 1 400                | 2 000                | 2 100          | 6G                                                                                  |
|                                                                                  | 370 | 512 000              | 390 000           | 306 000           | 256 000           | 150 000           | 122 000           | 150            | 105            | 1 400                | 2 000                | 2 100          | 6G                                                                                  |
|                                                                                  | 446 | 540 000              | 422 000           | 355 000           | 281 000           | 174 000           | 140 000           | 150            | 105            | 1 400                | 2 000                | 2 100          | 6G                                                                                  |
|                                                                                  | 529 | 498 000              | 460 000           | 397 000           | 318 000           | 191 000           | 159 000           | 150            | 105            | 1 400                | 2 000                | 1 500          | 6E                                                                                  |
| <b>R4 (C)</b>                                                                    | 481 | 384 000              | 291 000           | 234 000           | 196 000           | 121 000           | 100 000           | 134            | 125            | 1 400                | 2 000                | 1 100          | 6C                                                                                  |
|                                                                                  | 513 | 387 000              | 302 000           | 249 000           | 204 000           | 125 000           | 103 000           | 127            | 125            | 1 400                | 2 000                | 850            | 6B                                                                                  |
|                                                                                  | 617 | 435 000              | 335 000           | 272 000           | 221 000           | 138 000           | 112 000           | 121            | 125            | 1 400                | 2 000                | 850            | 6B                                                                                  |
|                                                                                  | 732 | 498 000              | 397 000           | 323 000           | 262 000           | 163 000           | 133 000           | 114            | 125            | 1 400                | 2 000                | 850            | 6B                                                                                  |

$$M_{2max} = 1.2 \cdot M_{n2} \quad (n_2 \cdot h = 10\,000)$$

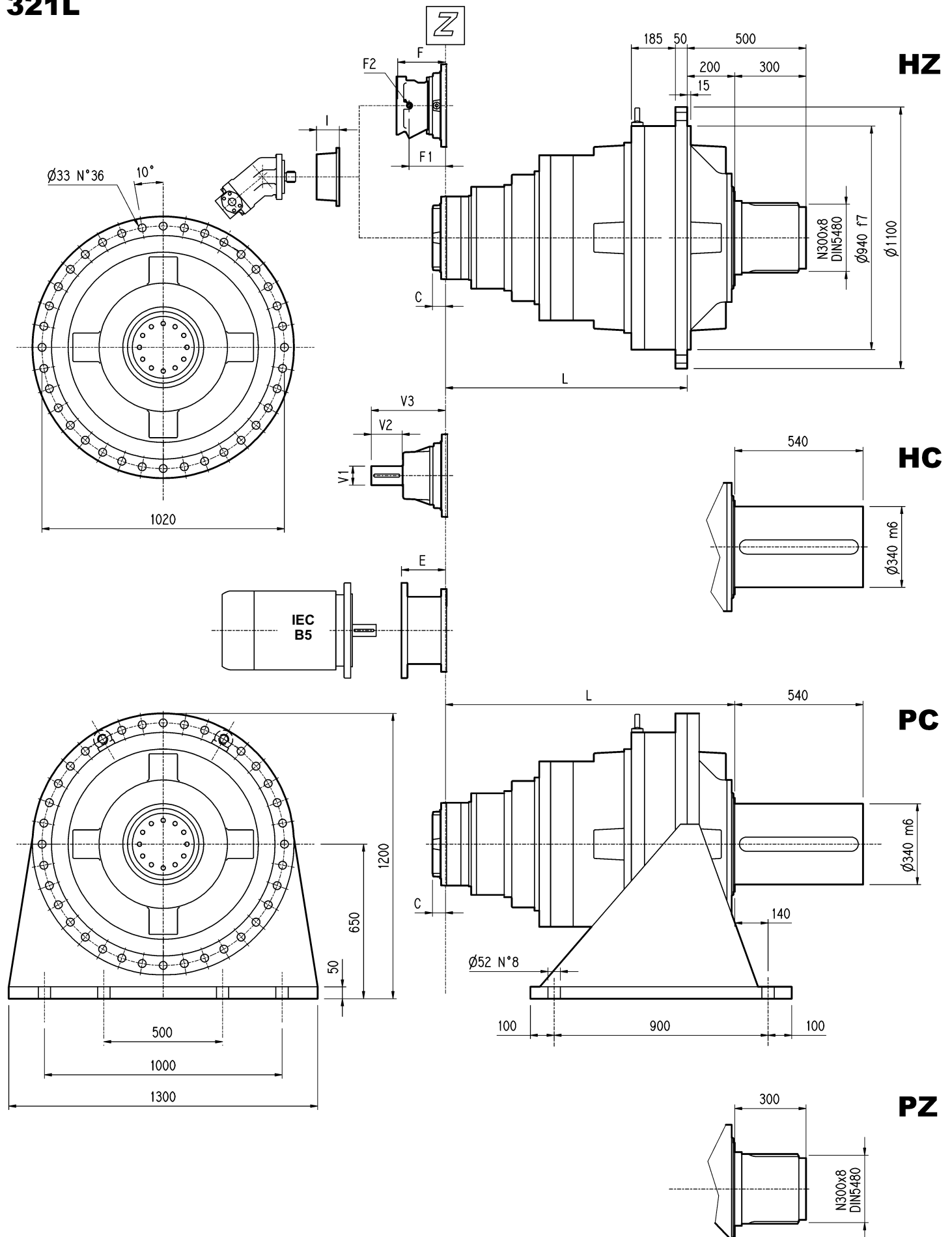
Nota: i contrassegni (A) (B) (C) sulla stessa grandezza, indicano riduzioni angolari di dimensioni differenti: vedere le pagine dimensionali.

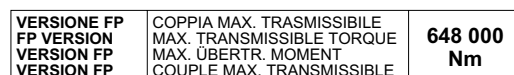
Note: Letters (A) (B) (C) near size indication identify different angle reduction dimensions. See pages relevant to dimensions.

Hinweis: Die Kennzeichnungen (A) (B) (C) an der gleichen Baugröße weisen auf die Winkelreduzierung in unterschiedlichen Maßen hin: siehe Seiten mit Maßtabellen.

Remarque : les indications (A) (B) (C) sur la même taille indique des réductions angulaires de dimensions différentes. Se reporter aux pages des dimensions.

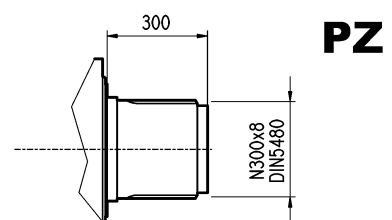
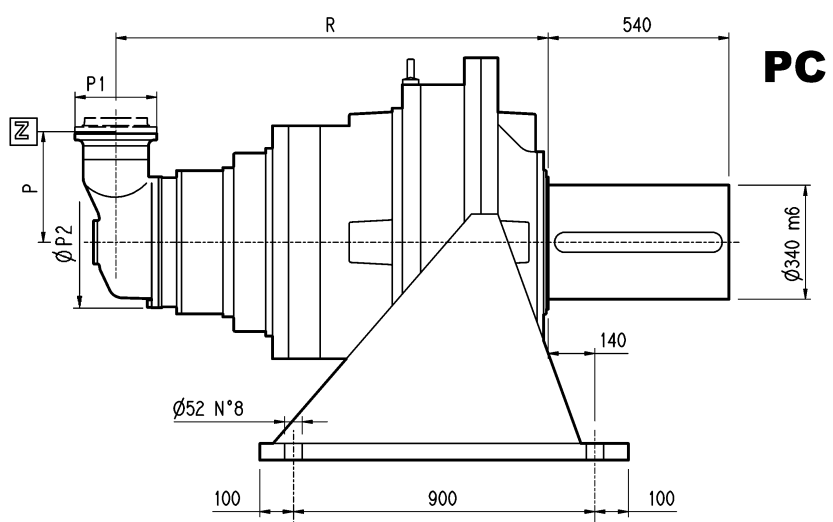
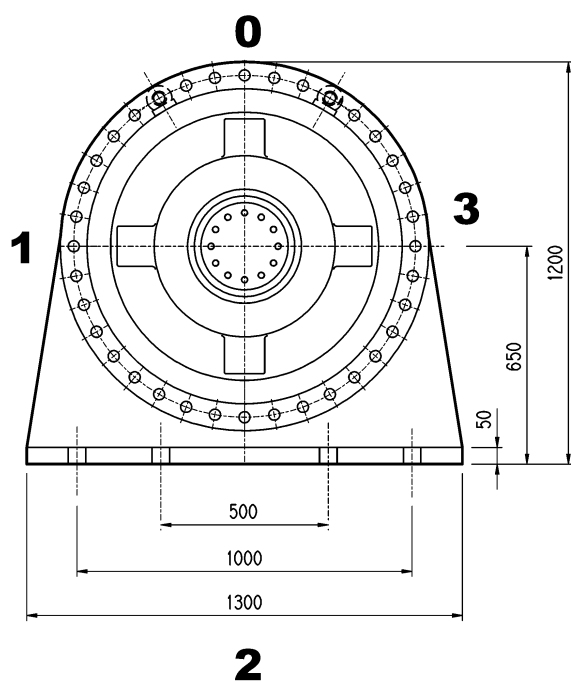
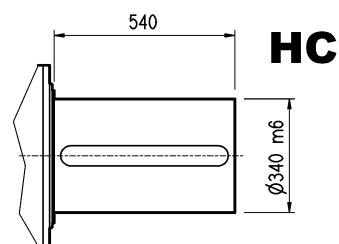
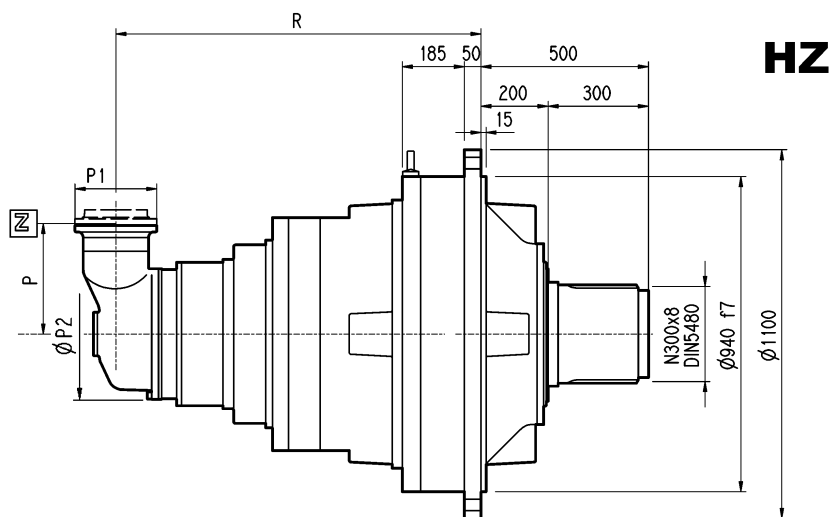
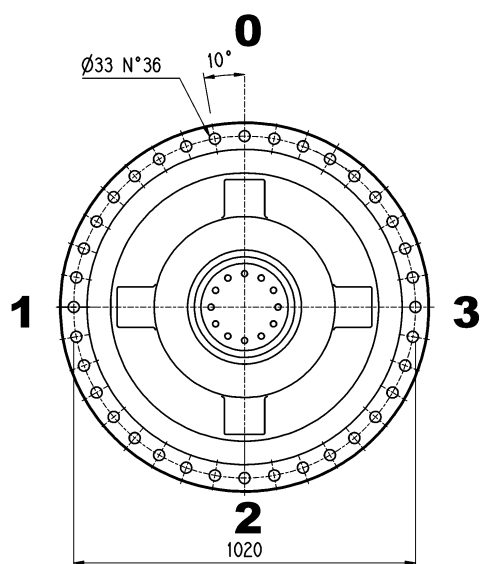
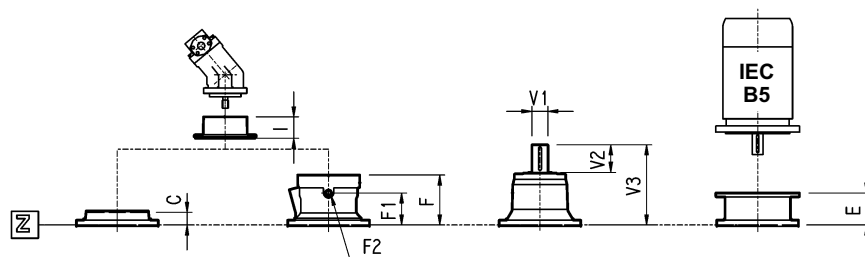
# 321L



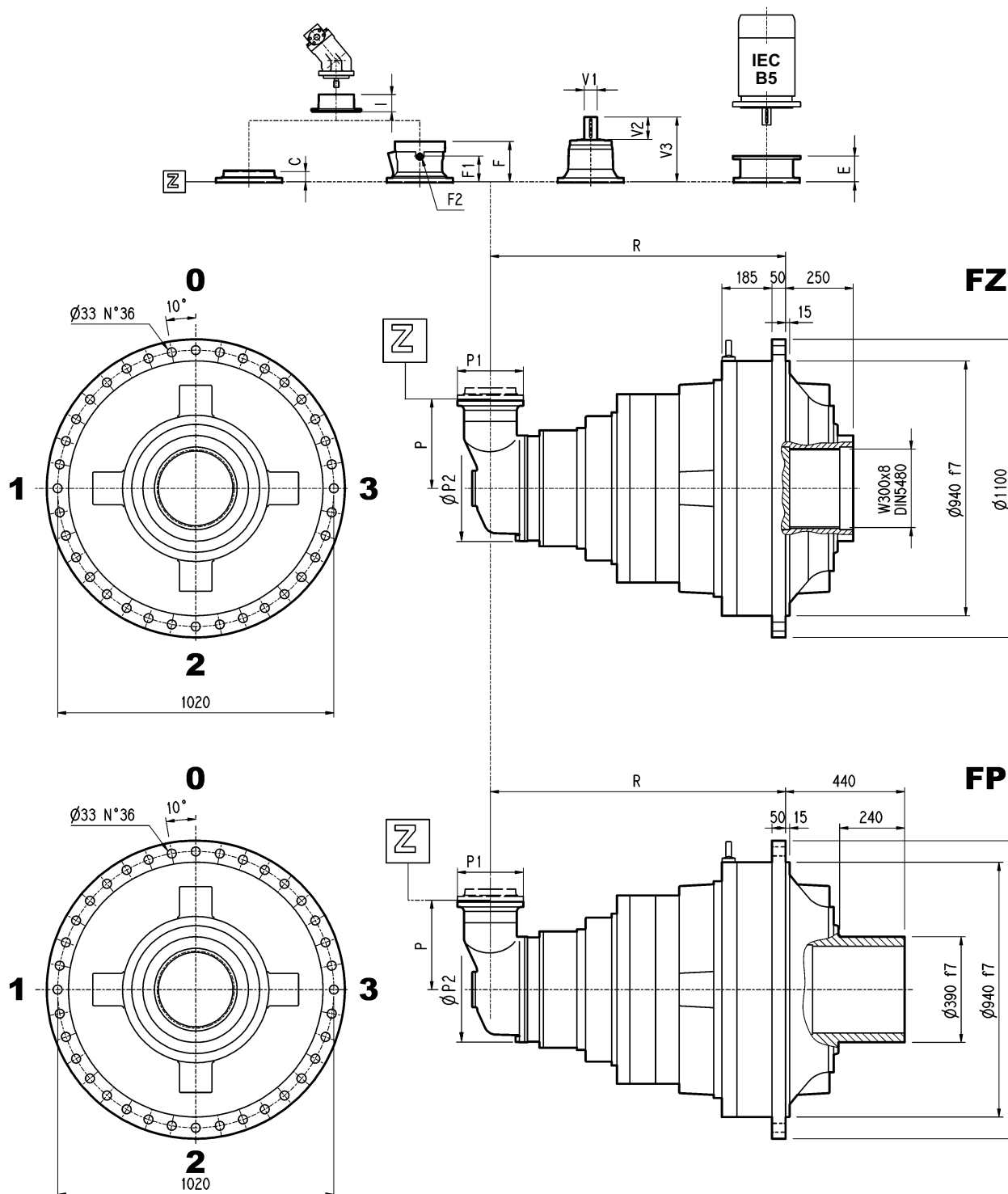


|        | V1 | V2  | V3  |  | V1 | V2  | V3  |  | E |  |  |  |  |  |     |     |     |     | IEC 180 | IEC 200 | IEC 225 | IEC 250 |
|--------|----|-----|-----|-------------------------------------------------------------------------------------|----|-----|-----|---------------------------------------------------------------------------------------|---|--|--|--|--|--|-----|-----|-----|-----|---------|---------|---------|---------|
| 321 L1 |    |     |     |                                                                                     |    |     |     |                                                                                       |   |  |  |  |  |  |     |     |     |     |         |         |         |         |
| 321 L2 |    |     |     |                                                                                     |    |     |     |                                                                                       |   |  |  |  |  |  |     |     |     |     |         |         |         |         |
| 321 L3 | 80 | 130 | 343 | 35                                                                                  |    |     |     |                                                                                       |   |  |  |  |  |  |     |     |     |     |         |         |         |         |
| 321 L4 | 80 | 130 | 315 | 35                                                                                  | 60 | 105 | 313 | 28                                                                                    |   |  |  |  |  |  | 195 | 186 | 216 | 215 |         |         |         |         |

# 321R



# 321R



|                                                       |                                                                                                            |               |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------|
| VERSIONE FP<br>FP VERSION<br>VERSION FP<br>VERSION FP | COPPIA MAX. TRASMISSIBILE<br>MAX. TRANSMISSIBLE TORQUE<br>MAX. ÜBERTR. MOMENT<br>COUPLE MAX. TRANSMISSIBLE | 648 000<br>Nm |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------|

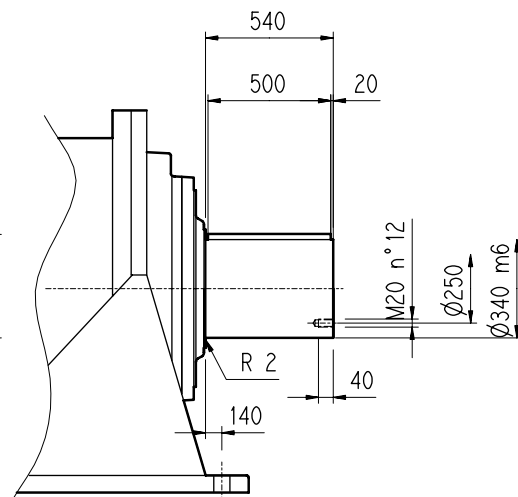
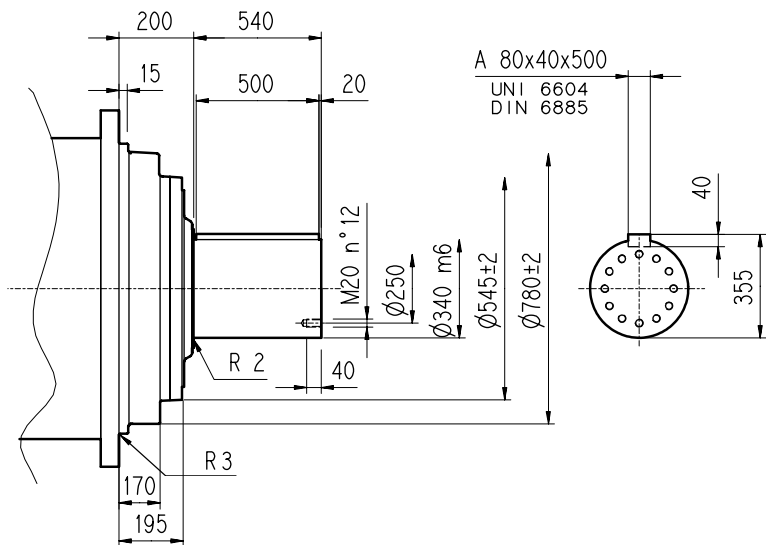
|            | R        |          |      |      | P   | P1  | P2  |  |          |      |      |  |                                       |  |  |     |       |                            |                                       |                                                                                       |
|------------|----------|----------|------|------|-----|-----|-----|-------------------------------------------------------------------------------------|----------|------|------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|-------|----------------------------|---------------------------------------|---------------------------------------------------------------------------------------|
|            | HZ<br>HC | PC<br>PZ | FZ   | FP   |     |     |     | HZ<br>HC                                                                            | PC<br>PZ | FZ   | FP   | C                                                                                   | Entrata<br>Input<br>Antrieb<br>Entrée |                                                                                       | F                                                                                     | F1  | F2    | Typ<br>Type<br>Typ<br>Type | Entrata<br>Input<br>Antrieb<br>Entrée |  |
| 321 R4 (B) | 1134     | 1334     | 1134 | 1134 | 345 | 262 | 400 | 2950                                                                                | 3250     | 2850 | 2850 | 45                                                                                  | B                                     |  | 195                                                                                   | 147 | 1/4 G | 6                          | B                                     | 28                                                                                    |
| 321 R4 (C) | 1134     | 1334     | 1134 | 1134 | 390 | 262 | 480 | 2960                                                                                | 3260     | 2860 | 2860 | 45                                                                                  | B                                     |                                                                                       | 195                                                                                   | 147 | 1/4 G | 6                          | B                                     | 28                                                                                    |
| 321 R4 (A) | 1134     | 1334     | 1134 | 1134 | 330 | 245 | 390 | 2930                                                                                | 3230     | 2830 | 2830 | 37                                                                                  | A                                     |                                                                                       | 191                                                                                   | 145 | 95    | 1/4 G                      | 5                                     | A                                                                                     |

|            | V1 | V2  | V3  |  | V1 | V2 | V3 |  | E      |        |        |        |         |         |         |         |         |         |         |         |
|------------|----|-----|-----|-------------------------------------------------------------------------------------|----|----|----|-------------------------------------------------------------------------------------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
|            |    |     |     |                                                                                     |    |    |    |                                                                                     | IEC 63 | IEC 71 | IEC 80 | IEC 90 | IEC 100 | IEC 112 | IEC 132 | IEC 160 | IEC 180 | IEC 200 | IEC 225 | IEC 250 |
| 321 R4 (B) | 60 | 105 | 307 | 23                                                                                  |    |    |    |                                                                                     |        |        |        |        |         |         |         |         | 152     | 182     | 212     | 193     |
| 321 R4 (C) | 60 | 105 | 307 | 23                                                                                  |    |    |    |                                                                                     |        |        |        |        |         |         |         |         | 152     | 182     | 212     | 193     |
| 321 R4 (A) | 48 | 82  | 239 | 15                                                                                  |    |    |    |                                                                                     |        |        |        |        |         | 114     | 144     | 144     | 174     |         |         |         |

# 321L - 321R

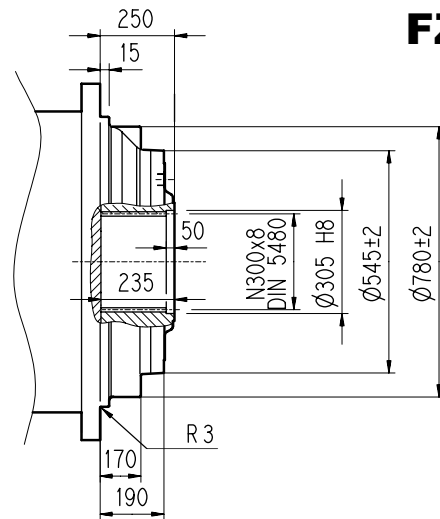
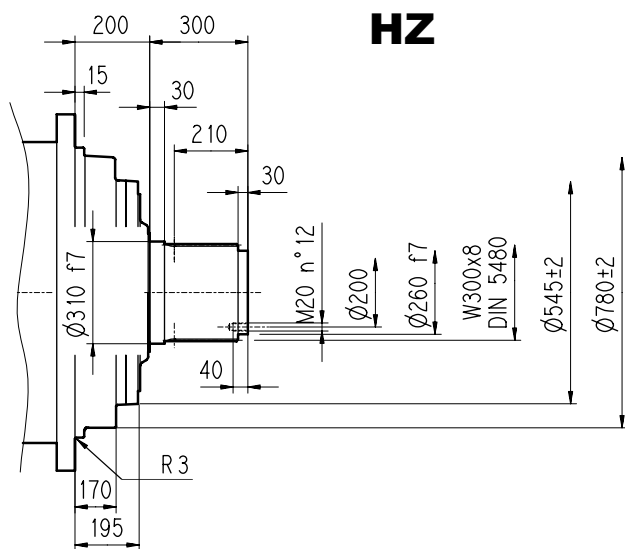
## HC

## PC

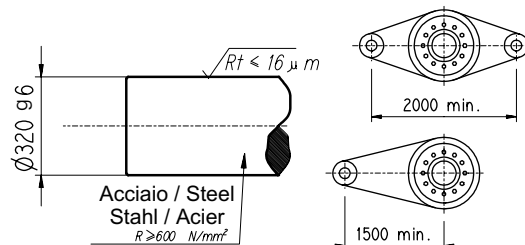
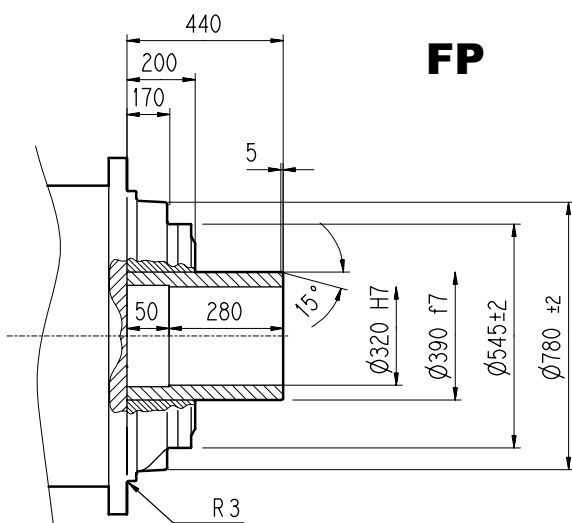


## HZ

## FZ



## FP

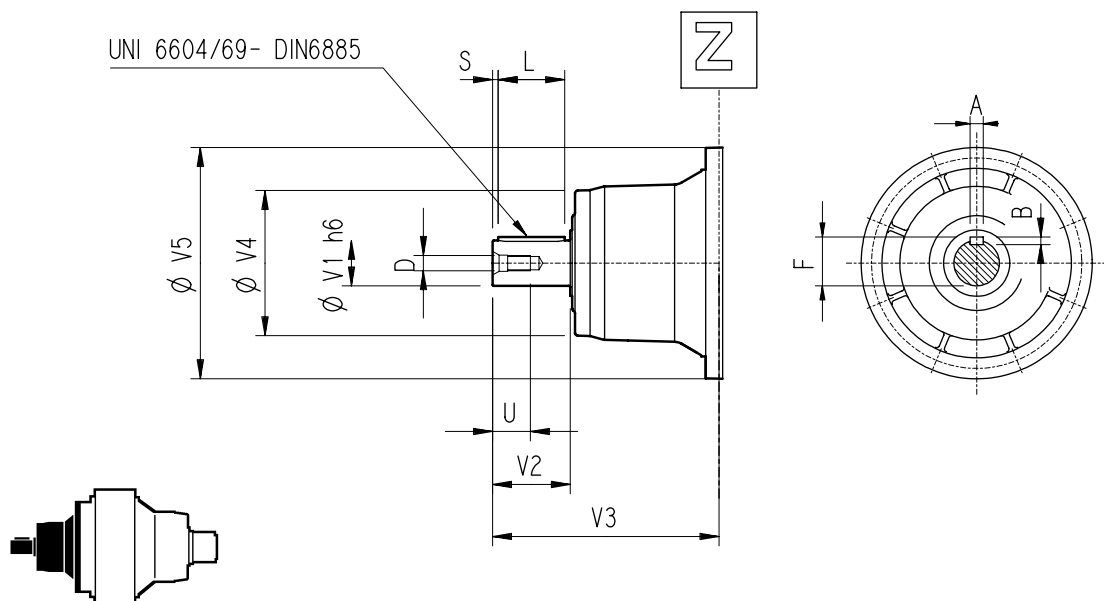


|             |                           |               |
|-------------|---------------------------|---------------|
| VERSIONE FP | COPPIA MAX. TRASMISSIBILE | 648 000<br>Nm |
| FP VERSION  | MAX. TRANSMISSIBLE TORQUE |               |
| VERSION FP  | MAX. ÜBERTR. MOMENT       |               |
| VERSION FP  | COUPLE MAX. TRANSMISSIBLE |               |



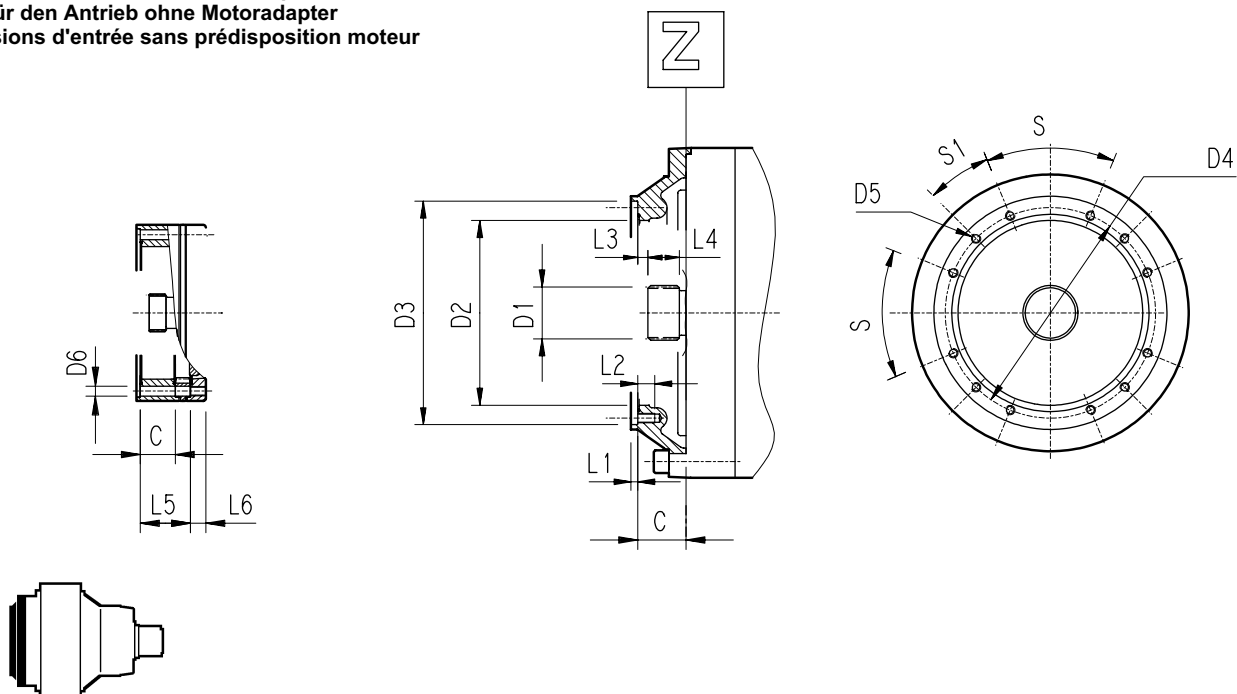
## 321L - 321R

Alberi veloci / Input shaft  
Antriebswellen / Arbres d'entrée



|                | CODE | V1 | V2  | V3  | V4  | V5  | A  | B  | F    | L   | S   | D   | U  |
|----------------|------|----|-----|-----|-----|-----|----|----|------|-----|-----|-----|----|
| 321 L3         | V11B | 80 | 130 | 343 | 200 | 428 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
| 321 L4         | V07B | 80 | 130 | 315 | 200 | 345 | 22 | 14 | 85   | 110 | 10  | M16 | 36 |
|                | V07A | 60 | 105 | 313 | 155 | 345 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |
| 321 R4 (A)     | V05B | 48 | 82  | 239 | 155 | 245 | 14 | 9  | 51.5 | 70  | 6   | M16 | 36 |
| 321 R4 (B) (C) | V06B | 60 | 105 | 307 | 155 | 292 | 18 | 11 | 64   | 90  | 7.5 | M16 | 36 |

Dimensioni d'entrata senza predisposizione motore  
Input dimension without motor adaptor  
Maße für den Antrieb ohne Motoradapter  
Dimensions d'entrée sans prédisposition moteur



|                | C   | D1             | D2  | D3     | D4  | D5       | D6 | L1 | L2 | L3  | L4 | L5 | L6 | S   | S1    | Entrata<br>Input<br>Antrieb<br>Entrée |
|----------------|-----|----------------|-----|--------|-----|----------|----|----|----|-----|----|----|----|-----|-------|---------------------------------------|
| 321 L1         |     |                |     |        |     |          |    |    |    |     |    |    |    |     |       |                                       |
| 321 L2         | 181 | 120x3 DIN 5480 | 365 | 390 f7 | 415 | M16 n°18 | /  | 4  | 30 | 3   | 65 | /  | /  | 20° | 20°   | F                                     |
| 321 L3         | 75  | 80x74 DIN 5482 | 270 | 335 H7 | 314 | M16 n°8  | /  | 5  | 30 | 9.5 | 40 | /  | /  | 60° | 30°   | D                                     |
| 321 L4         | 51  | 58x53 DIN 5482 | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11  | 22 | /  | /  | 45° | 22.5° | B                                     |
| 321 R4 (A)     | 37  | 40x36 DIN 5482 | 140 | 178 H7 | 165 | M10 n°8  | 11 | 4  | 18 | 9   | 18 | 0  | 0  | 45° | 45°   | A                                     |
| 321 R4 (B) (C) | 45  | 58x53 DIN 5482 | 195 | 236 H7 | 222 | M10 n°12 | /  | 4  | 18 | 11  | 22 | /  | /  | 45° | 22.5° | B                                     |

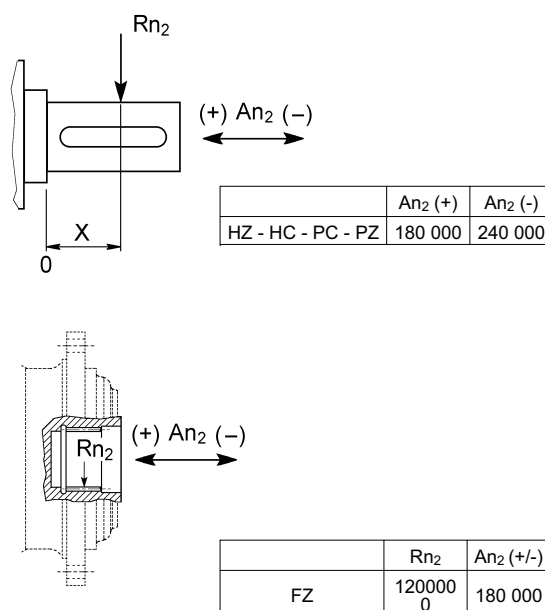
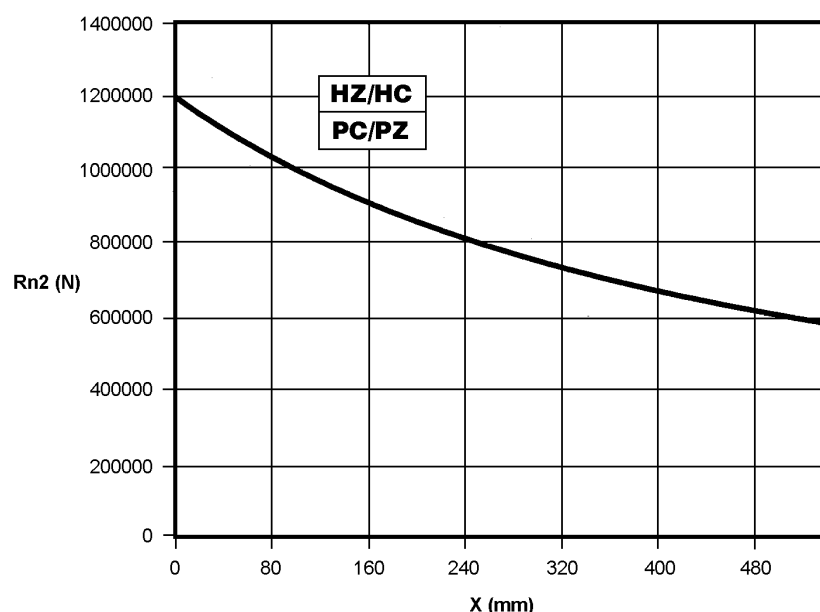
## 321L - 321R

Carichi radiali ed assiali ammissibili sull'albero lento per un valore di  $Fh_2 : n_2 \cdot h = 10\,000$

Permissible radial and axial loads on output shaft with  $Fh_2$   
 $n_2 \cdot h = 10\,000$

An der Ausgangswelle zulässige Radiallasten und Axialkräfte für einen Wert von  $Fh_2$   
 $n_2 \cdot h = 10\,000$

Charges radiales et axiales admises sur l'arbre lent pour une valeur de  $Fh_2 : n_2 \cdot h = 10\,000$



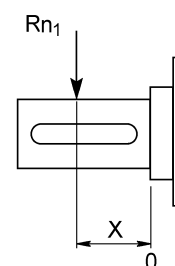
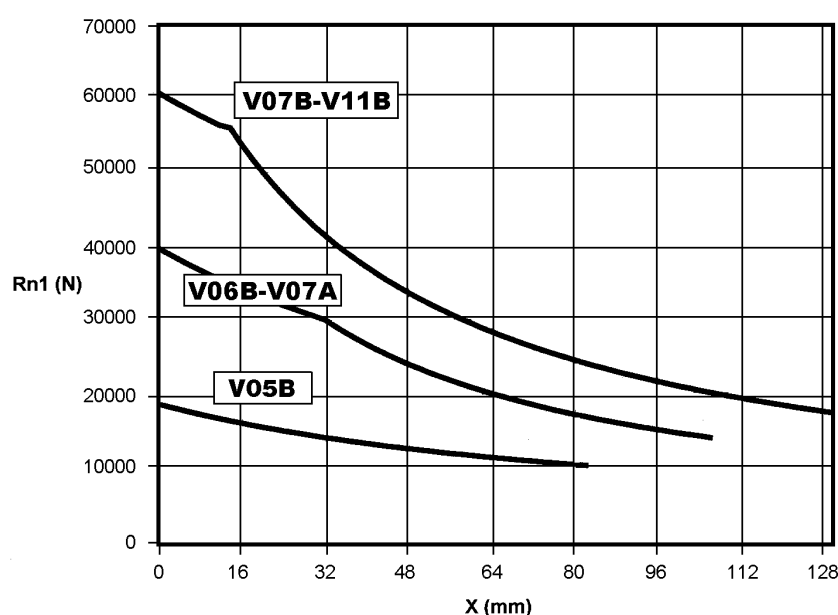
| Fattore $fh_2$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_2$ on shafts<br>Korrektionsfaktor $fh_2$ für wellenbelastungen<br>Facteur de correction $fh_2$ pour charges sur les arbres | $Fh_2 = n_2 \cdot h$ |                   |        |        |        |         |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|--------|--------|--------|---------|-----------|
|                                                                                                                                                                                                             | $fh_2$               | FZ                | 10 000 | 25 000 | 50 000 | 100 000 | 1 000 000 |
|                                                                                                                                                                                                             |                      |                   | 1      | 0.74   | 0.58   | 0.46    | 0.27      |
|                                                                                                                                                                                                             |                      | HZ - HC - PC - PZ | 1      | 0.76   | 0.61   | 0.50    | 0.31      |

Carichi radiali ammissibili sull'albero veloce per un valore di  $Fh_1 : n_1 \cdot h = 250\,000$

Permissible radial loads on input shaft with  $Fh_1 : n_1 \cdot h = 250\,000$

An der Antriebswelle zulässige Radiallasten für einen Wert von  $Fh_1 : n_1 \cdot h = 250\,000$

Charges radiales admises sur l'arbre d'entrée pour une valeur de  $Fh_1 : n_1 \cdot h = 250\,000$



| Fattore $fh_1$ correttivo per carichi sugli alberi<br>Load corrective factor $fh_1$ on shafts<br>Korrektionsfaktor $fh_1$ für wellenbelastungen<br>Facteur de correction $fh_1$ pour charges sur les arbres | $Fh_1 = n_1 \cdot h$ |         |         |           |           |           |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|---------|-----------|-----------|-----------|------------|
|                                                                                                                                                                                                             | $fh_1$               | 250 000 | 500 000 | 1 000 000 | 2 000 000 | 5 000 000 | 10 000 000 |
|                                                                                                                                                                                                             |                      | 1       | 0.79    | 0.63      | 0.50      | 0.37      | 0.29       |

## 24.0 FRENI IDRAULICI NEGATIVI A DISCHI MULTIPLI

### DESCRIZIONE

Sono freni statici di sicurezza, in quanto l'azione frenante è sviluppata quando la pressione idraulica di comando è nulla, mentre quando questa raggiunge i valori minimi per lo sbloccaggio, l'azione frenante cessa. Applicati in entrata ai riduttori, costituiscono un gruppo unico e compatto con essi. Si adottano in tutte quelle applicazioni dove è assolutamente necessario arrestare e tenere bloccata la trasmissione anche sotto l'azione di coppie esterne.

### Applicabili in:

- argani
- rotazione torrette
- freni di parcheggio su macchine semoventi
- applicazioni industriali

## 24.0 NEGATIVE MULTIDISC BRAKE

### DESCRIPTION

TRASMITAL's fail-safe parking brake is an oil immersed multidisc unit on the input side of the gearbox. The brake is operated when there is no hydraulic pressure and is released when the minimum release pressure is applied. Use of parking brake is necessary whenever the driven system must be kept at standstill even under external forces and/or torques.

### Applications:

- winches
- slewing drives
- parking brake on mobile equipment
- general industrial applications

## 24.0 HYDRAULISCH BELÜFTETE LAMELLEN- BREMSEN

### BESCHREIBUNG

Hierbei handelt es sich um Sicherheits- und Haltebremsen, bei denen die Bremswirkung eintritt, wenn der hydraulische Regel- druck gleich Null ist. Sobald der min. Öffnungsdruck erreicht wird, fällt die Bremswirkung nach. Die Bremse wird am Getriebeeingang angebracht und bildet zusammen mit dem Getriebe eine kompakte Einheit. Eine Bremse sollte dann vorgesehen werden, wenn ein Anhalten des Getriebes unbedingt notwendig ist auch bei äußerer Drehmomenteinwirkung.

### Einsatzfälle:

- Winden
- Drehwerke
- als Parkbremse bei Fahrzeugen
- Industrieanwendungen

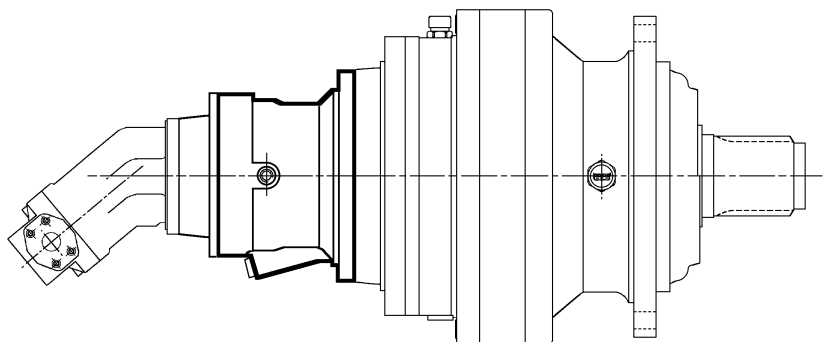
## 24.0 FREINS HYDRAULIQUES NEGATIFS

### DESCRIPTION

Il s'agit de freins de sécurité dans la mesure où l'action de freinage intervient lorsque la pression de commande est nulle, et à l'inverse lorsqu'elle atteint une valeur minimum pour le déblocage, l'action de freinage cesse. Appliqués à l'entrée des réducteurs, ils constituent, ensemble, un groupe unique et compact. Ils s'adaptent dans toutes les applications où il est absolument nécessaire d'arrêter et de maintenir bloquée la transmission, même sous l'action de couples extérieurs.

### Applications:

- Treuils
- Rotation tourelles
- Freins de parking sur équipements mobiles
- Applications industrielles



## DATI TECNICI FRENI / BRAKE TECHNICAL DATA TECHNISCHE DATEN BREMSEN / CARACTERISTIQUES TECHNIQUES

(A14)

|  |    |                 | Tipo/Type/Typ/Type |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |
|-------------------------------------------------------------------------------------|----|-----------------|--------------------|------|------|------|------|------|------|-------|-------|-------|-------|-------|------|------|------|------|------|------|
|                                                                                     |    |                 | 4.                 |      |      |      |      |      |      |       | 5.    |       |       |       |      | 6.   |      |      |      |      |
|                                                                                     |    |                 | A                  | B    | D    | F    | H    | K    | L    | B     | C     | E     | G     | K     | B    | C    | E    | G    | K    | L    |
| Coppia frenante statica                                                             | Mb | Nm<br>(10%)     | 50                 | 100  | 160  | 260  | 330  | 400  | 440  | 400   | 500   | 630   | 800   | 1000  | 850  | 1100 | 1500 | 2100 | 2600 | 3200 |
| Static braking torque                                                               | Mb |                 |                    |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |
| Statische bremsmoment                                                               | Mb |                 |                    |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |
| Couplè de freinage statique                                                         | Mb |                 |                    |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |
| Pressione minima apertura                                                           |    | bar             | 10                 | 20   | 30   | 20   | 25   | 30   | 34   | 20    | 27    | 20    | 26    | 32    | 14   | 19   | 25   | 19   | 24   | 29   |
| Min. opening pressure                                                               |    |                 |                    |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |
| Min. Öffnungsdruck                                                                  |    |                 |                    |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |
| Pression minime d'ouverture                                                         |    |                 |                    |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |
| Pressione massima comando                                                           |    | bar             | 320                |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |
| Max. operating pressure                                                             |    |                 |                    |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |
| Max. Druck                                                                          |    |                 |                    |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |
| Pression maxi de commande                                                           |    |                 |                    |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |
| Volume d'olio per comando                                                           |    | cm <sup>3</sup> | 6.65               | 6.65 | 6.65 | 6.65 | 6.65 | 6.65 | 6.65 | 13.96 | 13.96 | 13.96 | 13.96 | 13.96 | 37.2 | 37.2 | 37.2 | 37.2 | 37.2 | 37.2 |
| apertura freno                                                                      |    |                 |                    |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |
| Oil volume for brake release                                                        |    |                 |                    |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |
| Ölmenge zum öffnen bremsen                                                          |    |                 |                    |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |
| Volume d'huile pour commande                                                        |    |                 |                    |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |
| ouverture frein                                                                     |    |                 |                    |      |      |      |      |      |      |       |       |       |       |       |      |      |      |      |      |      |

## 25.0 ENTRATE PER MOTORI IDRAULICI

Tutte le grandezze sono predisponibili in ingresso per motori idraulici.

I tipi di predisposizioni disponibili sono indicati nelle pagine seguenti.

Gli orientamenti standard (A) delle flange attacco motore, sono indicati negli schemi seguenti, considerando il punto di vista dal lato ingresso sul riduttore.

## 25.0 INPUTS FOR HYDRAULIC MOTORS

All sizes can be supplied with hydraulic motor input flanges.

The available motor adaptors are shown in the following pages.

The standard orientations (A) of the motor flanges are shown in the following scheme, taking into consideration the input side of the gearbox.

## 25.0 ANTRIEBE FÜR HYDRAULISCHE MOTOREN

Alle Baugrößen sind vorbereitet für den Antrieb hydraulischer Motoren.

Die Anbaumöglichkeiten sind auf den folgenden Seiten angegeben.

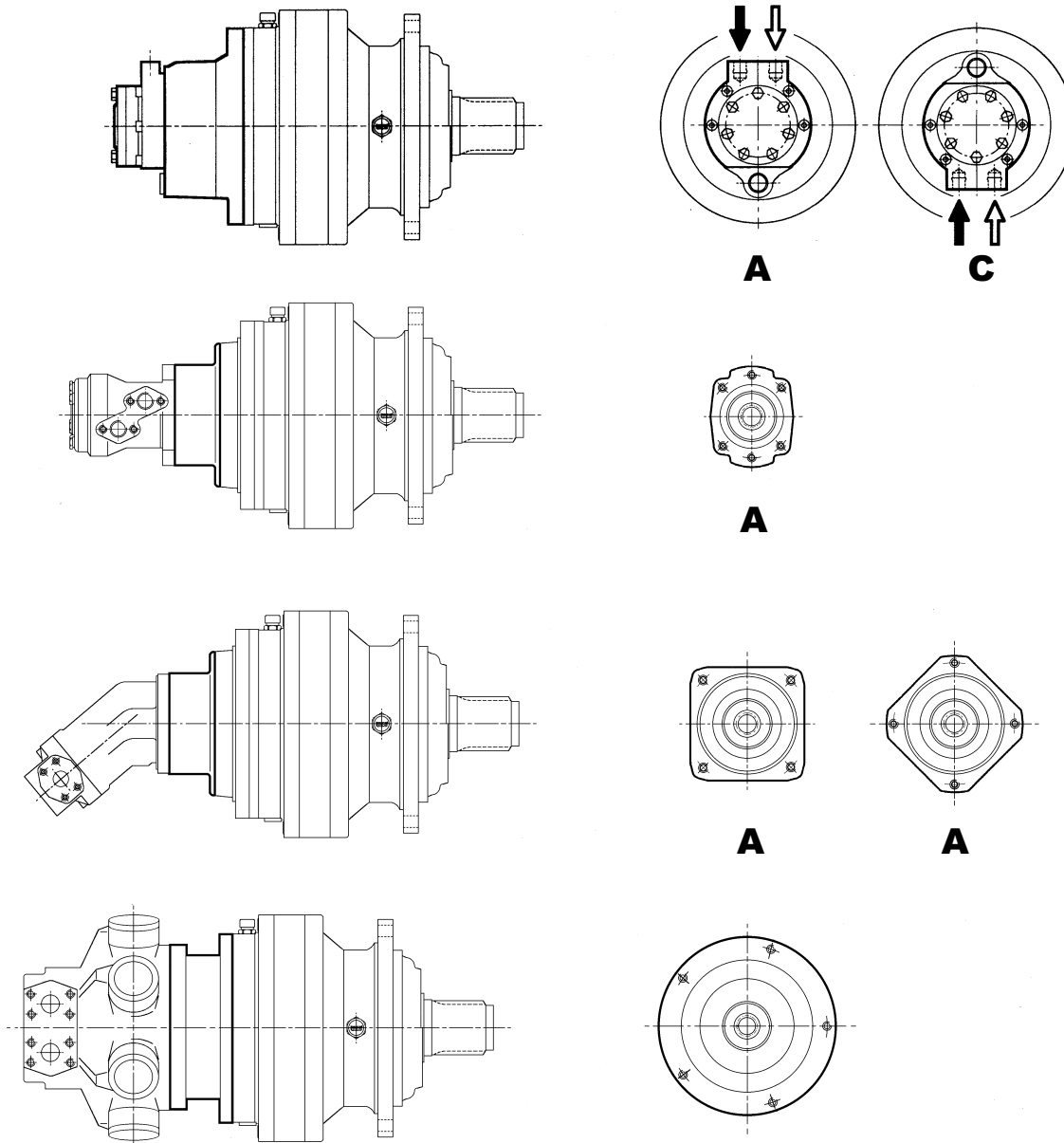
Die Standardorientierungen (A) der Motorflanschen werden in dem folgenden Schema angegeben, bei Ansicht auf die Eintriebsseite des Getriebes.

## 25.0 ENTREES POUR MOTEURS HYDRAULIQUES

Toutes les tailles sont prévues à l'entrée pour accouplement moteurs hydrauliques.

Les types de prédispositions disponibles sont indiqués dans les pages suivantes.

Les orientations standard (A) des brides accouplement moteur sont indiquées ci-dessous, en considérant le point de vue du côté entrée sur le réducteur.



Codici indicativi degli altri orientamenti:

**B:** + 90° (senso orario)  
**C:** + 180° (senso orario)  
**D:** + 270° (senso orario)

Identification codes of other arrangements:

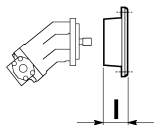
**B:** + 90° (clockwise)  
**C:** + 180° (clockwise)  
**D:** + 270° (clockwise)

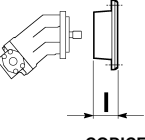
Anhaltsnummern der anderweitigen Ausrichtungsmöglichkeiten:

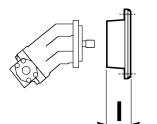
**B:** + 90° (im Uhrzeigersinn)  
**C:** + 180° (im Uhrzeigersinn)  
**D:** + 270° (im Uhrzeigersinn)

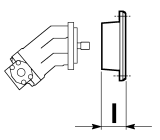
Codes indicatifs des autres orientations:

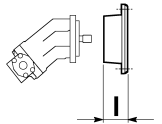
**B:** + 90° (sens horaire)  
**C:** + 180° (sens horaire)  
**D:** + 270° (sens horaire)

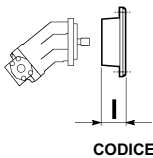


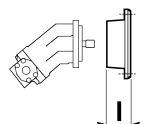
|  |                            | SAE Standard J744c |                  |                    |                |                     |                 |                    |                |                     |                 |                   |                   |
|----------------------------------------------------------------------------------|----------------------------|--------------------|------------------|--------------------|----------------|---------------------|-----------------|--------------------|----------------|---------------------|-----------------|-------------------|-------------------|
|                                                                                  |                            | SAE A<br>16/32 z8  | SAE A<br>ø15,8/5 | SAE B<br>16/32 z13 | SAE B<br>ø22,2 | SAE BB<br>16/32 z15 | SAE BB<br>ø25,4 | SAE C<br>12/24 z14 | SAE C<br>ø31,7 | SAE CC<br>12/24 z17 | SAE CC<br>ø38,1 | SAE D<br>8/16 z13 | SAE E<br>8/16 z13 |
|                                                                                  |                            | S5AM               | S5AN             | S5BA               | S5BB           | S5BM                | S5BN            | S5CA               | S5CB           | S5CP                | S5CQ            | S5DA              | S5EA              |
|                                                                                  |                            | I                  |                  |                    |                |                     |                 |                    |                |                     |                 |                   |                   |
| 300                                                                              | L1-L2-L3-L4<br>R2-R3-R4    | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  |                            | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
| 301                                                                              | L1-L2-L3-L4<br>R2-R3-R4    | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  |                            | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
| 303                                                                              | L1                         | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | L2-L3-L4                   | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | R2-R3-R4                   | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
| 305                                                                              | L1                         | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | L2-L3-L4                   | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | R2-R3-R4                   | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
| 306                                                                              | L1                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 101               | 113               |
|                                                                                  | L2                         | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | L3-L4                      | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | R2-R3-R4                   | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
| 307                                                                              | L1                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 101               | 113               |
|                                                                                  | L2                         | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | L3-L4                      | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | R2                         | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | R3-R4                      | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
| 309                                                                              | L1                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 101               | 113               |
|                                                                                  | L2                         | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | L3-L4                      | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | R2                         | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | R3-R4                      | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
| 310                                                                              | L1                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 146               | 158               |
|                                                                                  | L2                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 101               | 113               |
|                                                                                  | L3                         | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | L4                         | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | R2 (A)                     | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | R2 (B)                     |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 101               | 113               |
|                                                                                  | R3-R4                      | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
| 311                                                                              | L1                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 101               | 113               |
|                                                                                  | L2                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 81                |                   |
|                                                                                  | L3                         | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | L4                         | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | R2(B)-R2(C)<br>R2(A)-R3-R4 | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 101               | 113               |
| 313                                                                              | L1                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 101               | 113               |
|                                                                                  | L2                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 81                |                   |
|                                                                                  | L3                         | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | L4                         | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
| 315                                                                              | R2(B)-R2(C)<br>R2(A)-R3-R4 | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 101               | 113               |
|                                                                                  | L1                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 101               | 113               |
|                                                                                  | L2                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 81                |                   |
|                                                                                  | L3                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 101               | 113               |
| 316                                                                              | L4                         | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | R3(B)-R3(C)                | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  | R4                         | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  |                            |                    |                  |                    |                |                     |                 |                    |                |                     |                 |                   |                   |
| 317                                                                              | L1                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 101               | 113               |
|                                                                                  | L2                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 81                |                   |
|                                                                                  | L3                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 101               | 113               |
|                                                                                  | L4                         | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
| 318                                                                              | R3(B)-R3(C)<br>R3(A)-R4    | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  |                            |                    |                  |                    |                |                     |                 |                    |                |                     |                 |                   |                   |
|                                                                                  |                            |                    |                  |                    |                |                     |                 |                    |                |                     |                 |                   |                   |
| 319                                                                              | L1                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 101               | 113               |
|                                                                                  | L2                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 101               | 113               |
|                                                                                  | L3                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 81                |                   |
|                                                                                  | L4                         |                    |                  |                    |                |                     |                 |                    |                |                     |                 | 101               | 113               |
| 321                                                                              | R4(B)-R4(C)<br>R4(A)       | 42                 | 42               | 52                 | 52             | 52                  | 52              | 64                 | 64             | 80                  | 80              | 81                |                   |
|                                                                                  |                            |                    |                  |                    |                |                     |                 |                    |                |                     |                 |                   |                   |
|                                                                                  |                            |                    |                  |                    |                |                     |                 |                    |                |                     |                 |                   |                   |
|                                                                                  |                            |                    |                  |                    |                |                     |                 |                    |                |                     |                 |                   |                   |

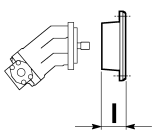


| <br>CODICE / CODE |                            | AXIAL PUMP                        | CALZONI                                                                                                                                                                                                                           |      |      |      |      |      |      |      | CHAR-LYNN (EATON)                                                                                                                                                                                                                                                                                                      |      |      |      |      |      |      |      |      |      |
|---------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|
|                                                                                                   |                            | M2-M2R-M2R1<br>24/50<br>16/32 z13 | <div>CALZONI<br/>MR190 N z8<br/>CALZONI<br/>MR300 N z8<br/>CALZONI<br/>MRP300 N z8<br/>CALZONI<br/>MR450 N z8<br/>CALZONI<br/>MR700 N z8<br/>CALZONI<br/>MR100 N z8<br/>CALZONI<br/>MR1800 N z8<br/>CALZONI<br/>MR2800 N z8</div> |      |      |      |      |      |      |      | <div>SERIE 2000<br/>SAE A 1" 6B<br/>SERIE 2000<br/>SAE A ø25,4<br/>SERIE 2000<br/>SAE A ø32<br/>SERIE 2000<br/>SAE A 12/24 z14<br/>SERIE 2000<br/>BEARINGLESS<br/>12/24 z12<br/>SERIE 4000<br/>SAE B ø31,75<br/>SERIE 4000<br/>SAE C 12/24 z17<br/>SERIE 6000<br/>SAE C ø38,1<br/>SERIE 6000<br/>SAE C 12/24 z17</div> |      |      |      |      |      |      |      |      |      |
|                                                                                                   |                            |                                   | S5BA                                                                                                                                                                                                                              | C0AA | C0AD | C0BL | C0AG | C0AL | C0AP | C0AS | C0AV                                                                                                                                                                                                                                                                                                                   | S5AQ | S5AS | D0AG | D0AH | E2AA | S5BP | S5CP | S5CQ | S5CP |
| I                                                                                                 |                            |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 300                                                                                               | L1-L2-L3-L4<br>R2-R3-R4    | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   |                            | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
| 301                                                                                               | L1-L2-L3-L4<br>R2-R3-R4    | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   |                            | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
| 303                                                                                               | L1                         | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | L2-L3-L4                   | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | R2-R3-R4                   | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
| 305                                                                                               | L1                         | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | L2-L3-L4                   | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | R2-R3-R4                   | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
| 306                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | L3-L4                      | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | R2-R3-R4                   | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
| 307                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | L3-L4                      | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | R2                         | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | R3-R4                      | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
| 309                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | L3-L4                      | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | R2                         | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | R3-R4                      | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
| 310                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      | 143  | 147  | 178  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | L4                         | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | R2 (A)                     | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | R2 (B)                     |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | R3-R4                      | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
| 311                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | L4                         | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | R2(B)-R2(C)<br>R2(A)-R3-R4 | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   | 98   | 102  | 133  |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
| 313                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | L4                         | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   |      |      |      |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
|                                                                                                   | R2(B)-R2(C)<br>R2(A)-R3-R4 | 52                                | 64                                                                                                                                                                                                                                | 78   | 78   | 98   | 102  | 133  |      |      | 42                                                                                                                                                                                                                                                                                                                     | 42   | 64   | 64   | 52   | 68   | 80   | 80   | 80   |      |
| 315                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 316                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 317                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 318                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 319                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 320                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 321                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 322                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 323                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 324                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 325                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 326                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 327                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 328                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 329                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 330                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 331                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 332                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 333                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 334                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 335                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 336                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 337                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 338                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 130  | 130  | 165  | 200  |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L2                         |                                   |                                                                                                                                                                                                                                   |      |      | 98   | 102  | 133  |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
|                                                                                                   | L3                         |                                   |                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |
| 339                                                                                               | L1                         |                                   |                                                                                                                                                                                                                                   |      |      |      | 1    |      |      |      |                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      |

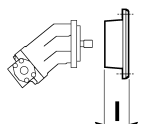


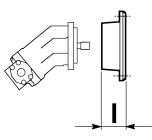
| <br>CODICE / CODE |             | SAUER DANFOSS (orbit)    |                                |                      |                         |                          |                    |                          |                           |                          | DENISON Hydraulics         |                          |                  |                       |                       |                          |                       |                   |      |
|---------------------------------------------------------------------------------------------------|-------------|--------------------------|--------------------------------|----------------------|-------------------------|--------------------------|--------------------|--------------------------|---------------------------|--------------------------|----------------------------|--------------------------|------------------|-----------------------|-----------------------|--------------------------|-----------------------|-------------------|------|
|                                                                                                   |             | OMP-OMR<br>50/315<br>ø25 | OMP-OMR<br>50/315<br>SAE 1" 6B | OMS<br>80/315<br>ø32 | OMS 80/315<br>12/24 z14 | OMSS 80/315<br>12/24 z12 | OMT 160/400<br>ø40 | OMT 160/400<br>12/24 z17 | OMTS 160/400<br>12/24 z16 | OMVS 315/80<br>10/20 z16 | M6-M7-M8 *3**<br>12/24 z14 | M11-M14 *3**<br>8/16 z13 | M3 B<br>16/32 z9 | MAC-MASC<br>16/32 z13 | MAD-MASD<br>12/24 z14 | MADC-MAS<br>DC 12/24 z14 | M4E-M4SE<br>12/24 z14 | MBBS<br>16/32 z13 |      |
|                                                                                                   |             | S5AP                     | S5AQ                           | D0AG                 | D0AH                    | D0AL                     | D0AM               | D0AN                     | D0AQ                      | D0AU                     | S5CA                       | S5EA                     | S5AM             | S5BA                  | S5CA                  | S5CA                     | S5CA                  | S5CA              | B5SA |
|                                                                                                   |             | I                        |                                |                      |                         |                          |                    |                          |                           |                          |                            |                          |                  |                       |                       |                          |                       |                   |      |
| 300                                                                                               | L1-L2-L3-L4 | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | R2-R3-R4    | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
| 301                                                                                               | L1-L2-L3-L4 | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | R2-R3-R4    | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
| 303                                                                                               | L1          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | L2-L3-L4    | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | R2-R3-R4    | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
| 305                                                                                               | L1          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | L2-L3-L4    | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | R2-R3-R4    | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
| 306                                                                                               | L1          |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | L2          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | L3-L4       | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | R2-R3-R4    | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
| 307                                                                                               | L1          |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | L2          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | L3-L4       | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | R2          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
| 309                                                                                               | R3-R4       | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | L1          |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | L2          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | L3-L4       | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
| 310                                                                                               | R2          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | R3-R4       | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | L1          |                          |                                |                      |                         |                          |                    |                          |                           | 115                      |                            | 158                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | L2          |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
| 311                                                                                               | L3          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | L4          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | R2(B)-R2(C) |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | R2(A)-R3-R4 | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
| 313                                                                                               | L1          |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | L2          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | L3          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | L4          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
| 315                                                                                               | R2(B)-R2(C) |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | R2(A)-R3-R4 | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | L1          |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | L2          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
| 316                                                                                               | L3          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | L4          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | R3(B)-R3(C) |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | R4          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
| 317                                                                                               | L1          |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | L2          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | L3          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | L4          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
| 318                                                                                               | R3(B)-R3(C) |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | R3(A)-R4    | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | L1          |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | L2          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
| 319                                                                                               | L3          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | L4          | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
|                                                                                                   | R4(B)-R4(C) |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | R4(A)       | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |
| 321                                                                                               | L1          |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | L2          |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | L3          |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | L4          |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
| 321                                                                                               | R4(B)-R4(C) |                          |                                |                      |                         |                          |                    |                          |                           | 70                       |                            | 113                      |                  |                       |                       |                          |                       |                   |      |
|                                                                                                   | R4(A)       | 42                       | 42                             | 64                   | 64                      | 37                       | 112                | 112                      | 57                        |                          | 64                         |                          | 42               | 52                    | 64                    | 64                       | 64                    | 52                |      |

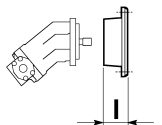


| <br>CODICE / CODE |             | DINAMIC OIL            |                        | LINDE               |                     |                           |                        |                               |                                |                                |                        |
|---------------------------------------------------------------------------------------------------|-------------|------------------------|------------------------|---------------------|---------------------|---------------------------|------------------------|-------------------------------|--------------------------------|--------------------------------|------------------------|
|                                                                                                   |             | DINAMIC<br>AH-BH200 z6 | DINAMIC<br>CH-DH350 z8 | MMF 43<br>16/32 z15 | MMF 63<br>12/24 z14 | HMF 28-35-02<br>16/32 z15 | HMF 50-02<br>16/32 z21 | HMF-HMV<br>75-02<br>16/32 z21 | HMF-HMV<br>105-02<br>16/32 z23 | HMF-HMV<br>135-02<br>16/32 z27 | BMF-BMV186<br>50x2 Z24 |
|                                                                                                   |             | D2AA                   | D2AB                   | S5BM                | S5CA                | S5BM                      | S5CE                   | S5CE                          | S5CD                           | S5DC                           | I5AF                   |
| I                                                                                                 |             |                        |                        |                     |                     |                           |                        |                               |                                |                                |                        |
| 300                                                                                               | L1-L2-L3-L4 | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | R2-R3-R4    | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
| 301                                                                                               | L1-L2-L3-L4 | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | R2-R3-R4    | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
| 303                                                                                               | L1          | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | L2-L3-L4    | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | R2-R3-R4    | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
| 305                                                                                               | L1          | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | L2-L3-L4    | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | R2-R3-R4    | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
| 306                                                                                               | L1          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L2          | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | L3-L4       | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | R2-R3-R4    | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
| 307                                                                                               | L1          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L2          | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | L3-L4       | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | R2          | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | R3-R4       | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
| 309                                                                                               | L1          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L2          | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | L3-L4       | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | R2          | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | R3-R4       | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
| 310                                                                                               | L1          |                        | 143                    |                     |                     |                           |                        |                               |                                | 146                            | 166                    |
|                                                                                                   | L2          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L3          | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | L4          | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | R2 (A)      | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | R2 (B)      |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | R3-R4       | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
| 311                                                                                               | L1          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L2          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L3          | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | L4          | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | R2(B)-R2(C) |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
| R2(A)-R3-R4                                                                                       | 64          |                        | 52                     | 64                  | 52                  | 64                        | 64                     | 64                            | 81                             |                                |                        |
| 313                                                                                               | L1          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L2          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L3          | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | L4          | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
| R2(B)-R2(C)                                                                                       |             | 98                     |                        |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | R2(A)-R3-R4 | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | 315         | L1                     |                        | 98                  |                     |                           |                        |                               |                                |                                | 101                    |
| L2                                                                                                |             |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
| L3                                                                                                |             |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
| L4                                                                                                |             | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
| R3(B)-R3(C)                                                                                       |             |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
| R3(A)-R4                                                                                          | 64          |                        | 52                     | 64                  | 52                  | 64                        | 64                     | 64                            | 81                             |                                |                        |
| 316                                                                                               | L1          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L2          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L3          | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | L4          | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | R3(B)-R3(C) |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
| R4                                                                                                | 64          |                        | 52                     | 64                  | 52                  | 64                        | 64                     | 64                            | 81                             |                                |                        |
| 317                                                                                               | L1          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L2          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L3          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L4          | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
| R3(B)-R3(C)                                                                                       |             | 98                     |                        |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | R3(A)-R4    | 64                     |                        | 52                  | 64                  | 52                        | 64                     | 64                            | 64                             | 81                             |                        |
|                                                                                                   | 318         | L1                     |                        | 98                  |                     |                           |                        |                               |                                |                                | 101                    |
| L2                                                                                                |             |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
| L3                                                                                                |             |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
| L4                                                                                                |             |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
| R4(B)-R4(C)                                                                                       |             |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
| 319                                                                                               | L1          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L2          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L3          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L4          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
| R4(B)-R4(C)                                                                                       |             | 98                     |                        |                     |                     |                           |                        |                               | 101                            | 121                            |                        |
| R4(A)                                                                                             | 64          |                        | 52                     | 64                  | 52                  | 64                        | 64                     | 64                            | 81                             |                                |                        |
| 321                                                                                               | L1          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L2          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L3          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | L4          |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
|                                                                                                   | R4(B)-R4(C) |                        | 98                     |                     |                     |                           |                        |                               |                                | 101                            | 121                    |
| R4(A)                                                                                             | 64          |                        | 52                     | 64                  | 52                  | 64                        | 64                     | 64                            | 81                             |                                |                        |

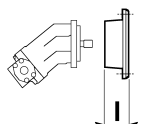
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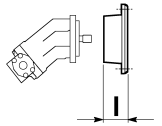
|  |             | OILDRIVE                 |                                |                            |                                | OLIOSTIP                   |                            | SAI              |                 |                       |                 |                 |                     |                         |
|----------------------------------------------------------------------------------|-------------|--------------------------|--------------------------------|----------------------------|--------------------------------|----------------------------|----------------------------|------------------|-----------------|-----------------------|-----------------|-----------------|---------------------|-------------------------|
|                                                                                  |             | HGL-HGT<br>50/400<br>ø25 | HGL-HGT<br>50/400<br>SAE 1" 8B | HGL-HGT<br>50/400<br>ø25,4 | HGL-HGT<br>50/400<br>25x22 z14 | OLIOS RMF20<br>0-300<br>z8 | OLIOS RMF40<br>0-600<br>z8 | GM05<br>UNI 8853 | GM1<br>UNI 8853 | GM1/P1/S1<br>35x2 z16 | GM2<br>UNI 8853 | GM3<br>UNI 8853 | GM4/GM5<br>UNI 8853 | SAI L7 (9)<br>N80x3 z25 |
|                                                                                  |             | S5AP                     | S5AQ                           | S5AS                       | S5AT                           | M5FB                       | M5FC                       | S2BA             | S2AB            | S2CE                  | S2AF-B          | S2DN            | S2BF                | S2BH                    |
| CODICE / CODE                                                                    |             | I                        |                                |                            |                                |                            |                            |                  |                 |                       |                 |                 |                     |                         |
| 300                                                                              | L1-L2-L3-L4 | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | R2-R3-R4    | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
| 301                                                                              | L1-L2-L3-L4 | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | R2-R3-R4    | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
| 303                                                                              | L1          | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | L2-L3-L4    | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | R2-R3-R4    | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
| 305                                                                              | L1          | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | L2-L3-L4    | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | R2-R3-R4    | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
| 306                                                                              | L1          |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 98              | 98              | 105                 |                         |
|                                                                                  | L2          | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | L3-L4       | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | R2-R3-R4    | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
| 307                                                                              | L1          |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 98              | 98              | 105                 |                         |
|                                                                                  | L2          | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | L3-L4       | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | R2          | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | R3-R4       | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
| 309                                                                              | L1          |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 98              | 98              | 105                 |                         |
|                                                                                  | L2          | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | L3-L4       | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | R2          | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | R3-R4       | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
| 310                                                                              | L1          |                          |                                |                            |                                |                            | 148                        |                  | 119             |                       | 143             | 143             | 150                 |                         |
|                                                                                  | L2          |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 98              | 98              | 105                 |                         |
|                                                                                  | L3          | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | L4          | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | R2 (A)      | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | R2 (B)      |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 98              | 98              | 105                 |                         |
| 311                                                                              | R3-R4       | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | L1          |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 135             | 98              | 142                 | 90                      |
|                                                                                  | L2          |                          |                                |                            |                                |                            |                            |                  | 74              |                       | 98              | 98              | 105                 |                         |
|                                                                                  | L3          | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | L4          | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
| 313                                                                              | R2(B)-R2(C) |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 98              | 98              | 105                 |                         |
|                                                                                  | R2(A)-R3-R4 | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | L1          |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 135             | 98              | 142                 | 90                      |
|                                                                                  | L2          |                          |                                |                            |                                |                            |                            |                  | 74              |                       | 98              | 98              | 105                 |                         |
|                                                                                  | L3          | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
| 315                                                                              | L4          | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | R3(B)-R3(C) |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 135             | 98              | 142                 | 90                      |
|                                                                                  | R3(A)-R4    | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | L1          |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 135             | 98              | 142                 | 90                      |
|                                                                                  | L2          |                          |                                |                            |                                |                            |                            |                  | 74              |                       | 98              | 98              | 105                 |                         |
| 316                                                                              | L3          | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | L4          |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 135             | 98              | 142                 | 90                      |
|                                                                                  | R3(B)-R3(C) |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 98              | 98              | 105                 |                         |
|                                                                                  | R4          | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | L1          |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 135             | 98              | 142                 | 90                      |
| 317                                                                              | L2          |                          |                                |                            |                                |                            |                            |                  | 74              |                       | 98              | 98              | 105                 |                         |
|                                                                                  | L3          | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | L4          |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 98              | 98              | 105                 |                         |
|                                                                                  | R3(B)-R3(C) |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 98              | 98              | 105                 |                         |
|                                                                                  | R3(A)-R4    | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
| 318                                                                              | L1          |                          |                                |                            |                                |                            |                            |                  |                 |                       |                 |                 |                     |                         |
|                                                                                  | L2          |                          |                                |                            |                                |                            |                            |                  |                 |                       |                 |                 |                     |                         |
|                                                                                  | L3          |                          |                                |                            |                                |                            |                            |                  |                 |                       |                 |                 |                     |                         |
|                                                                                  | L4          |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 135             | 98              | 142                 | 90                      |
|                                                                                  | R4(B)-R4(C) |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 98              | 98              | 105                 |                         |
| 319                                                                              | L1          |                          |                                |                            |                                |                            |                            |                  |                 |                       |                 |                 |                     |                         |
|                                                                                  | L2          |                          |                                |                            |                                |                            |                            |                  |                 |                       |                 |                 |                     |                         |
|                                                                                  | L3          |                          |                                |                            |                                |                            |                            |                  |                 |                       |                 |                 |                     |                         |
|                                                                                  | L4          |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 135             | 98              | 142                 | 90                      |
|                                                                                  | R4(B)-R4(C) |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 98              | 98              | 105                 |                         |
| 321                                                                              | R4(A)       | 42                       | 42                             | 42                         | 42                             | 78                         |                            | 73               | 37              | 57                    |                 |                 |                     |                         |
|                                                                                  | L1          |                          |                                |                            |                                |                            |                            |                  |                 |                       |                 |                 |                     |                         |
|                                                                                  | L2          |                          |                                |                            |                                |                            |                            |                  |                 |                       |                 |                 |                     |                         |
|                                                                                  | L3          |                          |                                |                            |                                |                            |                            |                  |                 |                       |                 |                 |                     |                         |
|                                                                                  | L4          |                          |                                |                            |                                |                            | 103                        |                  | 74              |                       | 135             | 98              | 142                 | 90                      |



|               |                                                    | KAWASAKI STAFFA |            |                                        | SAUER DANFOSS (piston)                 |                                  |                        |                        |                            |                                  |                                  |                      |                           |                      |                       |                       |                      |                      |                      |
|---------------|----------------------------------------------------|-----------------|------------|----------------------------------------|----------------------------------------|----------------------------------|------------------------|------------------------|----------------------------|----------------------------------|----------------------------------|----------------------|---------------------------|----------------------|-----------------------|-----------------------|----------------------|----------------------|----------------------|
|               |                                                    | B030 z17        | B045 z17   | HM (HD)B150<br>HM (HD)B200<br>5/10 z16 | OMF-SMF-OMV-<br>SMV 1-088<br>16/32 z13 | SMF<br>2033-052-070<br>16/32 z21 | SMF 2/089<br>16/32 z23 | SMF 2/119<br>16/32 z27 | SMF 2/166-227<br>16/32 z27 | SMF 4/023<br>90M042<br>16/32 z13 | SMF 4/046<br>90M042<br>16/32 z15 | 90 M055<br>16/32 z21 | 90 M075-M100<br>16/32 z23 | 90 M130<br>16/32 z27 | 51 V 060<br>12/24 z14 | 51 V 080<br>12/24 z14 | 51 V 110<br>8/16 z13 | 51 V 160<br>8/16 z13 | 51 V 250<br>8/16 z15 |
| CODICE / CODE |                                                    | S1AB            | S1AC       | S1AL                                   | S5BA                                   | S5CE                             | S5CD                   | S5DC                   | S5EC                       | S5BA                             | S5BM                             | S5CE                 | S5CD                      | S5DC                 | S5CA                  | S5CA                  | S5DA                 | S5DA                 | S5ED                 |
| I             |                                                    |                 |            |                                        |                                        |                                  |                        |                        |                            |                                  |                                  |                      |                           |                      |                       |                       |                      |                      |                      |
| 300           | L1-L2-L3-L4<br>R2-R3-R4                            |                 |            |                                        | 52                                     | 64                               | 64                     | 81                     |                            | 52                               | 52                               | 64                   | 64                        | 81                   | 64                    | 64                    | 81                   | 81                   |                      |
| 301           | L1-L2-L3-L4<br>R2-R3-R4                            |                 |            |                                        | 52                                     | 64                               | 64                     | 81                     |                            | 52                               | 52                               | 64                   | 64                        | 81                   | 64                    | 64                    | 81                   | 81                   |                      |
| 303           | L1<br>L2-L3-L4<br>R2-R3-R4                         |                 |            |                                        | 52                                     | 64                               | 64                     | 81                     |                            | 52                               | 52                               | 64                   | 64                        | 81                   | 64                    | 64                    | 81                   | 81                   |                      |
| 305           | L1<br>L2-L3-L4<br>R2-R3-R4                         |                 |            |                                        | 52                                     | 64                               | 64                     | 81                     |                            | 52                               | 52                               | 64                   | 64                        | 81                   | 64                    | 64                    | 81                   | 81                   |                      |
| 306           | L1<br>L2<br>L3-L4<br>R2-R3-R4                      | 135             | 140        |                                        | 52                                     | 64                               | 64                     | 81                     | 101                        | 113                              | 52                               | 52                   | 64                        | 64                   | 81                    | 64                    | 64                   | 81                   | 113                  |
| 307           | L1<br>L2<br>L3-L4<br>R2<br>R3-R4                   | 135             | 140        |                                        | 52                                     | 64                               | 64                     | 81                     | 101                        | 113                              | 52                               | 52                   | 64                        | 64                   | 81                    | 64                    | 64                   | 81                   | 113                  |
| 309           | L1<br>L2<br>L3-L4<br>R2<br>R3-R4                   | 135             | 140        |                                        | 52                                     | 64                               | 64                     | 81                     | 101                        | 113                              | 52                               | 52                   | 64                        | 64                   | 81                    | 64                    | 64                   | 81                   | 113                  |
| 310           | L1<br>L2<br>L3<br>L4<br>R2 (A)<br>R2 (B)<br>R3-R4  | 180<br>135      | 185<br>140 |                                        | 52                                     | 64                               | 64                     | 81                     | 101                        | 113                              | 52                               | 52                   | 64                        | 64                   | 81                    | 64                    | 64                   | 81                   | 158                  |
| 311           | L1<br>L2<br>L3<br>L4<br>R2(B)-R2(C)<br>R2(A)-R3-R4 | 135             | 140        | 187                                    | 52                                     | 64                               | 64                     | 81                     | 101                        | 113                              | 52                               | 52                   | 64                        | 64                   | 81                    | 64                    | 64                   | 81                   | 113                  |
| 313           | L1<br>L2<br>L3<br>L4<br>R2(B)-R2(C)<br>R2(A)-R3-R4 | 135             | 140        | 187                                    | 52                                     | 64                               | 64                     | 81                     | 101                        | 113                              | 52                               | 52                   | 64                        | 64                   | 81                    | 64                    | 64                   | 81                   | 113                  |
| 315           | L1<br>L2<br>L3<br>L4<br>R3(B)-R3(C)<br>R3(A)-R4    | 135             | 140        | 187                                    | 52                                     | 64                               | 64                     | 81                     | 101                        | 113                              | 52                               | 52                   | 64                        | 64                   | 81                    | 64                    | 64                   | 81                   | 113                  |
| 316           | L1<br>L2<br>L3<br>L4<br>R3(B)-R3(C)<br>R4          | 135             | 140        | 187                                    | 52                                     | 64                               | 64                     | 81                     | 101                        | 113                              | 52                               | 52                   | 64                        | 64                   | 81                    | 64                    | 64                   | 81                   | 113                  |
| 317           | L1<br>L2<br>L3<br>L4<br>R3(B)-R3(C)<br>R3(A)-R4    | 135             | 140        | 187                                    | 52                                     | 64                               | 64                     | 81                     | 101                        | 113                              | 52                               | 52                   | 64                        | 64                   | 81                    | 64                    | 64                   | 81                   | 113                  |
| 318           | L1<br>L2<br>L3<br>L4<br>R4(B)-R4(C)                | 135             | 140        | 187                                    |                                        |                                  |                        | 101                    | 113                        |                                  |                                  |                      |                           | 101                  |                       |                       | 101                  | 101                  | 113                  |
| 319           | L1<br>L2<br>L3<br>L4<br>R4(B)-R4(C)<br>R4(A)       | 135             | 140        | 187                                    |                                        |                                  |                        | 101                    | 113                        |                                  |                                  |                      |                           | 101                  |                       |                       | 101                  | 101                  | 113                  |
| 321           | L1<br>L2<br>L3<br>L4<br>R4(B)-R4(C)<br>R4(A)       | 135             | 140        | 187                                    |                                        |                                  |                        | 101                    | 113                        |                                  |                                  |                      |                           | 101                  |                       |                       | 101                  | 101                  | 113                  |



| CODICE / CODE |             | TRW-TORQMOTOR (PARKER) |                        |                        |                        |                        | VICKERS (EATON)     |                       |                           |                       | WHITE                 |                         |                       |                         |                          |
|---------------|-------------|------------------------|------------------------|------------------------|------------------------|------------------------|---------------------|-----------------------|---------------------------|-----------------------|-----------------------|-------------------------|-----------------------|-------------------------|--------------------------|
|               |             | MAG 04-32<br>SAE 1" 6B | MAF 06-40<br>SAE 1" 6B | MAB 06-32<br>SAE 1" 6B | MAB 06-32<br>SAE A 625 | MAE 10-68<br>SAE 1" 6B | MFE 19<br>16/32 z15 | 25M**A11<br>16/32 z13 | 35-45 M**A11<br>12/24 z14 | 50 M**A11<br>8/16 z13 | HS 02-15<br>SAE A 625 | HS 02-15<br>SAE A 1" 6B | RS 08-24<br>SAE A 625 | RS 08-24<br>SAE A 1" 6B | REO 06-45<br>SAE A 1" 6B |
|               |             | S5AQ                   | S5AQ                   | S5AQ                   | S5AP                   | S5AQ                   | S5BM                | S5BA                  | S5CA                      | S5DA                  | S5AP                  | S5AQ                    | S5AP                  | S5AQ                    | S5AP                     |
| I             |             |                        |                        |                        |                        |                        |                     |                       |                           |                       |                       |                         |                       |                         |                          |
| 300           | L1-L2-L3-L4 | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | R2-R3-R4    | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
| 301           | L1-L2-L3-L4 | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | R2-R3-R4    | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
| 303           | L1          | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | L2-L3-L4    | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | R2-R3-R4    | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
| 305           | L1          | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | L2-L3-L4    | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | R2-R3-R4    | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
| 306           | L1          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | L2          | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | L3-L4       | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | R2-R3-R4    | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
| 307           | L1          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | L2          | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | L3-L4       | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | R2          | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
| 309           | R3-R4       | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | L1          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | L2          | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | L3-L4       | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
| 310           | R2          | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | R3-R4       | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | L1          |                        |                        |                        |                        |                        |                     |                       |                           | 146                   |                       |                         |                       |                         |                          |
|               | L2          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
| 311           | L3          | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | L4          | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | R2(B)-R2(C) |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | R2(A)-R3-R4 | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
| 313           | L1          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | L2          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | L3          | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | L4          | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
| 315           | R2(B)-R2(C) |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | R2(A)-R3-R4 | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | L1          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | L2          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
| 316           | L3          | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | L4          | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | R3(B)-R3(C) |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | R4          | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
| 317           | L1          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | L2          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | L3          | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | L4          | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
| 318           | R3(B)-R3(C) |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | R3(A)-R4    | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
|               | L1          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | L2          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
| 319           | L3          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | L4          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | R4(B)-R4(C) |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | R4(A)       | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |
| 321           | L1          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | L2          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | L3          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | L4          |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
| 321           | R4(B)-R4(C) |                        |                        |                        |                        |                        |                     |                       |                           | 101                   |                       |                         |                       |                         |                          |
|               | R4(A)       | 42                     | 42                     | 42                     | 42                     | 42                     | 52                  | 52                    | 64                        | 81                    | 42                    | 42                      | 42                    | 42                      | 42                       |



CODICE / CODE

**VOAC (PARKER)**

|            |             | F11-5<br>CK ø18 | F11-10<br>CK ø20 | F11-19<br>CK ø25 | F11-19 CD<br>25x1,25 z18 | F1230 MF1'D<br>30x2 z14 | F1240 MF1'D<br>32x2 z14 | F1260 MF1'D<br>35x2 z16 | F1280 MF1'D<br>40x2 z18 | F12-110<br>MF1'D<br>45x2 z21 | F11-150/250<br>S+S<br>8/16 z13 | V12 080 I'D<br>35x2 z16 | V12 080 S'S<br>12/24 z14 | V12 080 N'D<br>40x2 z18 | V12 080 S'S<br>12/24 z14 | V12 110 I'D<br>45x2 z21 | V12 110 S'S<br>8/16 z13 | V12 160 S'S<br>8/16 z13 | V12 160 N'C<br>45x2 z21 |
|------------|-------------|-----------------|------------------|------------------|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------------|--------------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|            |             | V0AA            | V0AC             | V0AE             | V0AG                     | H0AE                    | H0AI                    | H0BC                    | H0BG                    | H0CA                         | S5DA                           | H0BC                    | S5CA                     | H0BG                    | S5CA                     | H0CA                    | S5DA                    | S5DA                    | H0CG                    |
|            |             | I               |                  |                  |                          |                         |                         |                         |                         |                              |                                |                         |                          |                         |                          |                         |                         |                         |                         |
| <b>300</b> | L1-L2-L3-L4 | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | R2-R3-R4    | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
| <b>301</b> | L1-L2-L3-L4 | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | R2-R3-R4    | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
| <b>303</b> | L1          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | L2-L3-L4    | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
| <b>305</b> | R2-R3-R4    | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | L1          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
| <b>306</b> | L2-L3-L4    | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | R2-R3-R4    | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
| <b>307</b> | L1          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | L2          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
| <b>309</b> | L3-L4       | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | R2          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
| <b>310</b> | R3-R4       | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | L1          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
| <b>311</b> | L2          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | L3          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
| <b>313</b> | L4          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | R2 (A)      | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
| <b>315</b> | R2 (B)      | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | R3-R4       | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
| <b>316</b> | L1          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | L2          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
| <b>317</b> | L3          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | L4          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
| <b>318</b> | R3(B)-R3(C) | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | R3(A)-R4    | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
| <b>319</b> | L1          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | L2          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
| <b>321</b> | L3          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | L4          | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
| <b>321</b> | R4(B)-R4(C) | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |
|            | R4(A)       | 64              | 52               | 53               | 53                       | 52                      | 64                      | 64                      | 75                      | 101                          | 81                             | 64                      | 64                       | 75                      | 64                       | 101                     | 81                      | 81                      | 101                     |

## 26.0 MOTORI IDRAULICI

### Presentazione

I riduttori serie 300 sono fornibili completi di motori idraulici MG prodotti dalla TRASMITAL BONFIGLIOLI. Le forme e dimensioni di tali motori sono definiti per ottenere la massima integrazione con il riduttore ottenendo così motoriduttori con ottime caratteristiche di compattezza ed economicità.

## 26.0 HYDRAULIC MOTORS

### General features

Gearboxes belonging to the series 300 can be supplied complete with MG hydraulic motors manufactured by TRASMITAL BONFIGLIOLI. These motors were designed to provide compact and energy efficient gearmotors.

## 26.0 HYDRAULIKMOTOREN

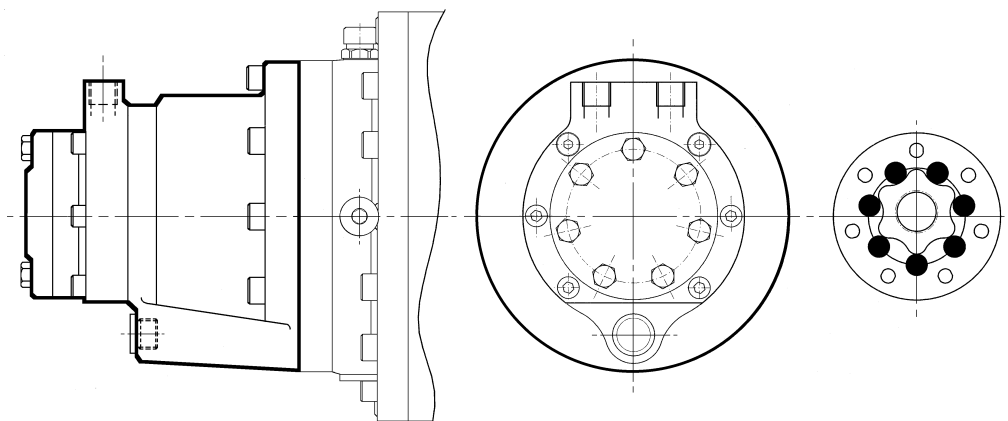
### Vorstellung

Die Getriebe der Serie 300 können komplett mit den von der TRASMITAL BONFIGLIOLI hergestellten MG-Hydraulikmotoren geliefert werden. Diese integrierten Hydraulikmotoren sind eine optimale Lösung in Bezug auf Kompaktheit und Wirtschaftlichkeit.

## 26.0 MOTEURS HYDRAULIQUES

### Présentation

Les réducteurs série 300 peuvent être livrés équipés de moteurs hydrauliques MG fabriqués par TRASMITAL BONFIGLIOLI. Les formes et les dimensions de ces moteurs sont établies dans le but d'obtenir une intégration optimale avec le réducteur, pour aboutir à des motoréducteurs avec des caractéristiques de compacité et rentabilité excellentes.



### Motori idraulici MG

#### Caratteristiche costruttive:

- Sistema orbitale, con rulli fra rotore e statore GEROLER®
- Distributore sull'albero d'uscita.
- Cilindrate da 50 a 250 cm<sup>3</sup>
- Pressione max 175 bar
- Portata max 48 lt/min
- Rendimenti elevati
- Possibilità di avere il freno idraulico nella stessa dimensione d'ingombro
- Comando freno interno direttamente dal motore, senza la necessità di valvole e circuiti esterni.

### MG hydraulic motors

#### Design characteristics:

- Orbit system with GEROLER® rollers between rotor and stator
- Distributor on output shaft
- Displacements from 50 to 250 cm<sup>3</sup>
- Max. pressure 175 bar
- Max. flow rate 48 lt/min
- High efficiency
- Hydraulic brake can be included in the motor overall dimensions
- Inner brake directly controlled by the motor with no valves or outer circuits required.

### Hydraulikmotoren MG

#### Baumerkmale:

- Orbitalsystem, mit Rollen zwischen Rotor und Stator GEROLER®
- Wegeventil auf Abtriebswelle
- Hubraum von 50 bis 250 cm<sup>3</sup>
- Max. Druck 175 bar
- Max. Förderleistung 48 lt/min
- Höhere Wirkungsgrade
- Möglichkeit, eine hydraulische Bremse bei gleichen Abmessungen zu integrieren
- Bremssteuerung erfolgt intern direkt über den Motor, ohne einen Einsatz von Ventilen und äußeren Kreisläufen.

### Moteurs hydrauliques MG

#### Caractéristiques de construction:

- Système orbital, avec rouleaux entre rotor et stator GEROLER®
- Distributeur sur l'arbre lent
- Cylindrées 50 à 250 cm<sup>3</sup>
- Pression max. 175 bar
- Débit max. 48 l/min.
- Rendements élevés.
- Possibilité d'obtenir le frein hydraulique avec les mêmes dimensions d'encombrement.
- Frein intérieur commandé directement par le moteur, sans l'exigence de clapets ni de circuits extérieurs.

## 27.0 SIMBOLOGIA E UNITA' DI MISURA

## 27.0 SYMBOLS AND UNITS OF MEASURE

## 27.0 VERWENDETE SYMBOLE

## 27.0 SYMBOLES ET UNITES

| Simb. Symb.  | U.m. Meßeinh.        | Descrizione                              | Description                        | Beschreibung                                  | Description                                  |
|--------------|----------------------|------------------------------------------|------------------------------------|-----------------------------------------------|----------------------------------------------|
| <b>V</b>     | [cm <sup>3</sup> ]   | Cilindrata                               | Rot.displacement                   | Umdr. Hubraum                                 | Tour cylindrée                               |
| <b>p</b>     | [bar]                | Pressione                                | Pressure                           | Druck                                         | Pression                                     |
| <b>pA,pB</b> | [bar]                | Pressione sugli attacchi A e B           | Pressure in A and B connections    | Druck an den Anschlüssen A und B              | Pression sur les raccords A et B             |
| <b>Q</b>     | [l/min]              | Portata                                  | Flow rate                          | Durchflußleistung                             | Débit                                        |
| $\eta_t$     |                      | Rendimento totale                        | Efficiency                         | Wirkungsgrad                                  | Rendement                                    |
| $\eta_{mh}$  |                      | Rendimento meccanico - idraulico         | Hydraulic-mechanical efficiency    | Mechanischer-hydraulischer Wirkungsgrad       | Rendement mécanique-hydraulique              |
| $\eta_v$     |                      | Rendimento volumetrico                   | Volumetric efficiency              | Volumetrischer Wirkungsgrad                   | Rendement volumétrique                       |
| <b>n</b>     | [min <sup>-1</sup> ] | Velocità angolare                        | Angular speed                      | Drehzahl                                      | Vitesse angulaire                            |
| <b>M</b>     | [Nm]                 | Coppia effettiva all'albero motore       | Actual torque onto the motor shaft | Effektives Drehmoment an der Welle            | Couple réel sur l'arbre                      |
| <b>cont</b>  |                      | Valore generico, continuo nel tempo      | General value, for continuous duty | Allgemeiner Wert, in der Zeit kontinuierlich  | Valeur générale, continue dans le temps      |
| <b>int</b>   |                      | Valore generico, intermittente nel tempo | General value, intermittent duty   | Allgemeiner Wert, in der Zeit intermittierend | Valeur générale, intermittente dans le temps |

## 28.0 CARATTERISTICHE TECNICHE

## 28.0 TECHNICAL FEATURES

## 28.0 TECHNISCHE EIGENSCHAFTEN

## 28.0 CARACTERISTIQUES TECHNIQUES

### 28.1 Cilindrata V [cm<sup>3</sup>]

È il volume geometrico generato ad ogni giro, corrispondente al volume teorico di olio idraulico necessario per fare ruotare l'albero motore di un giro.

### 28.1 Displacement V [cm<sup>3</sup>]

Geometrical volume produced as a result of each motor rotation corresponding to the theoretical volume of hydraulic oil necessary for a rotation of the driving shaft.

### 28.1 Hubraum V [cm<sup>3</sup>]

Ist das geometrische Volumen, welches bei jeder Umdrehung erzeugt wird und dem theoretischen Volumen des Hydrauliköls, welches für eine Umdrehung der Antriebswelle erforderlich ist, entspricht.

### 28.1 Cylindrée V [cm<sup>3</sup>]

Il s'agit du volume géométrique créé à chaque tour, correspondant au volume théorique en huile hydraulique nécessaire pour faire avancer l'arbre moteur d'un tour.

### 28.2 Pressione p [bar]

È la pressione idraulica a cui viene sottoposto il motore nel suo funzionamento.

### 28.2 Pressure p [bar]

Hydraulic pressure applied to the motor when running.

### 28.2 Druck p [bar]

Ist der hydraulische Druck, dem der Motor während seines Betriebs unterliegt.

### 28.2 Pression p [bar]

Il s'agit de la pression hydraulique à laquelle le moteur en service est soumis.

### 28.3 Portata Q [l/min]

È il flusso di olio idraulico che attraversa il motore nel suo funzionamento.

### 28.3 Flow rate Q [l/min]

Hydraulic oil flow through the motor when running.

### 28.3 Förderleistung Q [l/min]

Ist der Fluß des Hydrauliköls, der den Motor während dessen Betriebs durchquert.

### 28.3 Débit Q [l/min]

Il s'agit de l'écoulement d'huile hydraulique traversant le moteur en service.

### 28.4 Rendimento totale $\eta_t$

È il rendimento totale del motore idraulico dato dal prodotto:

### 28.4 Efficiency $\eta_t$

Total efficiency of the hydraulic motor given by:

### 28.4 Wirkungsgrad $\eta_t$

Ist der Gesamtwirkungsgrad des hydraulischen Motors, der sich aus der folgenden Formel ergibt:

### 28.4 Rendement $\eta_t$

Il s'agit du rendement total du moteur hydraulique découlant du produit de:

$$\eta_t = \eta_{mh} \cdot \eta_v \quad (29)$$

### 28.5 Rendimento meccanico-idraulico $\eta_{mh}$

Rappresenta il rapporto fra coppia effettiva e coppia teorica all'albero motore. Dipende dalle perdite interne dovute ad attriti meccanici e perdite di pressione del fluido idraulico, è dato dalla formula:

### 28.5 Mechanical-hydraulic efficiency $\eta_{mh}$

This is the ratio of actual torque to theoretical torque at the driving shaft. Value depending on inner losses due to mechanical friction as well as hydraulic fluid pressure losses, calculated as follows:

### 28.5 Mechanischer-hydraulischer Wirkungsgrad $\eta_{mh}$

Ist das Verhältnis zwischen effektivem und theoretischem Drehmoment an der Antriebswelle. Hängt von den, durch mechanische Reibung erzeugten Verlusten und Druckverlusten der Hydraulikflüssigkeit ab und ergibt sich aus der folgenden Formel:

### 28.5 Rendement mécanique-hydraulique $\eta_{mh}$

Représente le rapport entre couple efficace et couple Théorique à l'arbre moteur. Dépend des pertes intérieures dues à des frottements mécaniques et chutes de pression du fluide hydraulique, il découle de la formule:

$$\eta_{mh} = \frac{2\pi \cdot 10 \cdot M}{(pA - pB) \cdot V} \quad (30)$$

|                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>28.6 Rendimento volumetrico</b> <math>\eta_V</math></p> <p>Rappresenta il rapporto fra velocità effettiva e velocità teorica del motore. Dipende dal trafilamento interno del motore fra i volumi in alta e bassa pressione, è dato dalla formula:</p> | <p><b>28.6 Hydraulic efficiency</b> <math>\eta_V</math></p> <p>This is the ratio of motor actual speed to motor theoretical speed. Value depending on the motor inner blow-by between high and low pressure volumes. This value is given by the following formula:</p> | <p><b>28.6 Volumetrischer Wirkungsgrad</b> <math>\eta_V</math></p> <p>Ist das Verhältnis zwischen effektiver und theoretischer Drehzahl des Motors. Hängt von den inneren Verlusten des Motors zwischen den Volumen im Hoch- und Niederdruck ab. Er ergibt sich aus der folgenden Formel:</p> | <p><b>28.6 Rendement volumétrique</b> <math>\eta_V</math></p> <p>Réprésente le rapport entre vitesse réelle et vitesse théorique du moteur. Dépend du débordement à l'intérieur du moteur entre les volumes de haute et basse pression; il découle la formule:</p> |
| $\eta_V = \frac{n \cdot V}{Q \cdot 1000} \quad (31)$                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                    |
| <p><b>28.7 Velocità angolare</b> <math>n</math> [min<sup>-1</sup>]</p> <p>È la velocità di rotazione del motore idraulico, è dato dalla formula:</p>                                                                                                         | <p><b>28.7 Angular speed</b> <math>n</math> [min<sup>-1</sup>]</p> <p>Hydraulic motor rotation speed. Value resulting from the following formula:</p>                                                                                                                  | <p><b>28.7 Drehzahl</b> <math>n</math> [min<sup>-1</sup>]</p> <p>Ist die Drehgeschwindigkeit des Hydraulikmotors und wird von der folgenden Formel gegeben:</p>                                                                                                                               | <p><b>28.7 Vitesse angulaire</b> <math>n</math> [min<sup>-1</sup>]</p> <p>Est la vitesse de rotation du moteur hydraulique, elle est le résultat de la formule :</p>                                                                                               |
| $n = \frac{Q \cdot 1000}{V} \cdot \eta_V \quad (32)$                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                    |
| <p><b>28.8 Coppia M</b> [Nm]</p> <p>È la coppia effettiva che riesce a trasmettere il motore idraulico, è data dalla formula:</p>                                                                                                                            | <p><b>28.8 Torque M</b> [Nm]</p> <p>Actual torque transmitted by the hydraulic motor. Value given by the following formula:</p>                                                                                                                                        | <p><b>28.8 Drehmoment M</b> [Nm]</p> <p>Tatsächliches Drehmoment des Hydraulikmotors ergibt sich aus folgender Formel:</p>                                                                                                                                                                    | <p><b>28.8 Couple M</b> [Nm]</p> <p>Est le couple effectif que le moteur hydraulique est en mesure de transmettre; il découle de la formule :</p>                                                                                                                  |
| $M = \frac{(p_A - p_B) \cdot V}{2 \pi \cdot 10} \cdot \eta_{mh} \quad (33)$                                                                                                                                                                                  |                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                    |

**MG - 160 ZA I 2 C - P01 S N**

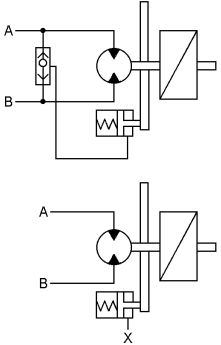
GUARNIZIONI / SEALS  
DICHTUNGEN / JOINTS D'ETANCHEITE

**N** = standard, mescola nitrilbutadiene  
standard, nbr rubber  
Standard, Nitrilbutadien  
standard, nitrilbutadiene

COMANDO FRENO / BRAKE PILOT  
BREMSSTEUERUNG / COMMANDE FREIN

**P** = interno, diretto dal motore  
(solo con attacchi B02)  
internal, direct through the motor  
(with B02 ports only)  
intern, direkt vom motor  
(nur mit anschlüssen B02)  
interieur, directement du moteur  
(seulement avec orifices B02)

**S** = non predisposto, occorre circuito esterno  
(solo con attacchi P01)  
not connected, external piping necessary  
(with P01 ports only)  
nicht vorgesehen, ausserer kreislauf erforderlich  
(nur mit anschlüssen P01)  
non pas predispose, il faut circuit exteieur  
(seulement avec orifices P01)



ATTACCHI / PORTS / ANSCHLÜSSE / RACCORDS

**P01** = porte di alimentazione direttamente sul corpo motore  
(solo esecuzione S)  
oil ports on motor housing direct  
(S execution only)  
Arbeitsanschlüsse direkt auf demgehaue  
(nur ausführung S)  
orifices d'alimentation sur le carter  
(seulement execution **S**)

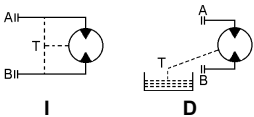
**B02** = porte di alimentazione con valvola selettore comando freno  
(solo esecuzione P)  
oil ports with valve brake pilot  
(P execution only)  
Arbeitsanschlüsse mit bremssteuerventil  
(nur ausführung P)  
orifices d'alimentation avec valve commande frein  
(seulement execution P)

PROGRESSIVO DI MODIFICA / PROGRESSIVE MODIFICATION  
LAUFANDE ÄNDERUNGEN / PROGRESSIF DES MODIFICATIONS

SERIE COSTRUTTIVA / CONSTRUCTION SERIES / BAUSERIE / SERIE CONSTRUCTIF  
**2**

DRENAGGIO / DRAIN / LECKÖLANSCHLUSS / DRAINAGE

**I** = Interno / internal / intern / interieur  
**D** = Esterno / external / extern / exterieur



ESECUZIONE ALBERO / SHAFT EXECUTION / WELLENVERSION / ARBRE VERSION

CILINDRATA / DISPLACEMENT / HUBRAUM / CYLINDREE

**050** (49.2 cm<sup>3</sup>)  
**080** (81.9 cm<sup>3</sup>)  
**100** (101.6 cm<sup>3</sup>)  
**125** (126.2 cm<sup>3</sup>)  
**160** (162.2 cm<sup>3</sup>)  
**200** (201.6 cm<sup>3</sup>)  
**250** (252.4 cm<sup>3</sup>)

TIPO / TYPE / TYP / TYPE

### 30.0 SCELTA

La cilindrata  $V$  del motore idraulico deve essere scelta insieme al riduttore.

Nota la coppia di uscita da trasmettere dal riduttore  $M_{r2}$  e la sua velocità  $n_2$  si procede come segue:

- Fissare il valore della pressione di comando del motore  $pA-pB \leq 175$  bar.
- Calcolare il valore della cilindrata equivalente  $V_{eq}$  del motoriduttore con la formula:

### 30.0 DISPLACEMENT SELECTION

Displacement  $V$  of the hydraulic motor should be selected together with the gearbox.

Once the output torque and speed  $n_2$  for the gearbox  $M_{r2}$  is known, proceed as follows:

- Define the control pressure value  $pA-pB \leq 175$  bar for the motor.
- Calculate the gearbox displacement value called  $V_{eq}$  with the following formula:

$$V_{eq} = \frac{2\pi \cdot 10 \cdot M_{r2}}{(pA - pB) \cdot \eta_{mh} \cdot \eta_d} \quad [cm^3] \quad (34)$$

dove per  $\eta_{mh}$  fissare inizialmente 0,85;

$\eta_d$ : rendimento dinamico riduttore fissare 0.94.

- Calcolare il valore della portata  $Q$  necessaria per alimentare il motore idraulico con la formula:

where  $\eta_{mh}$ , for example, is equal to 0.85;

$\eta_d$ : gearbox dynamic efficiency, consider 0.94.

- Calculate the value for flow rate  $Q$ , necessary for feeding the hydraulic motor, with the following formula:

$$Q = \frac{n_2 \cdot V_{eq}}{1000 \cdot \eta_v} \quad [l/min] \quad (35)$$

dove per  $\eta_v$  fissare inizialmente 0,90.

- In base alle prestazioni richieste  $M_{r2}$  ed  $n_2$  scegliere la grandezza del riduttore (vedi a pag. 29).

- Entrare nel diagramma (A15) del motoriduttore con il valore di cilindrata equivalente  $v_{eq}$  e scegliere contemporaneamente:
  - il motore che soddisfi le condizioni di  $p$  int e  $Q$  richieste.
  - Il valore indicativo di  $i$ , tenendo presente che questo venga ottenuto con il minimo numero di stadi di riduzione, così da ottenere un motoriduttore con il costo più basso e con dimensioni compatte.
 Con il valore di  $M_2$  ed il valore indicativo di  $i$ , procedere alla selezione ed alla verifica del riduttore secondo quanto indicato nel cap. 14.

where  $\eta_v$ , for example is equal to 0.90.

- Select the gearbox size with  $M_{r2}$ . See gearbox selection on page 29.

- Look up the diagram (A15) for the gearmotor with equivalent displacement value  $v_{eq}$  and select:
  - a motor that fulfils the  $p$  int. and  $Q$  requirements and at the same time
  - the indicative value of reduction ratio  $i$ . Please consider that ratio should be obtained with as few reduction stages as possible, to save on gearmotor costs and contain dimensions.
 Once you have determined the value of  $M_2$  and the indicative value of  $i$ , select the gearbox and check your selection as indicated in chap. 14.

### 30.0 AUSWAHL

Die Auswahl des Hubraums  $V$  des Hydraulikmotors muß gemeinsam mit der Getriebewahl getroffen werden.

Ist das vom Getriebe  $M_{r2}$  zu übertragende Abtriebsdrehmoment und die entsprechende Drehzahl  $n_2$  bekannt, geht man folgendermaßen vor:

- Den Wert des Steuerdrucks des Motors  $pA-pB \leq 175$  bar festlegen.
- Den Wert des gleichwertigen Hubraums  $V_{eq}$  des Getriebemotors unter Anwendung der folgenden Formel berechnen:

### 30.0 CHOIX

Le choix de la cylindrée  $V$  du moteur hydraulique doit s'accompagner au choix du réducteur.

Une fois qu'on a établi le couple de sortie à transmettre par le réducteur  $M_{r2}$  et sa vitesse  $n_2$ , il faut procéder comme suit:

- Fixer la valeur de pression de commande du moteur  $pA-pB \leq 175$  bar.
- Calculer la valeur de la cylindrée équivalente  $V_{eq}$  du motoréducteur par la formule:

wo für  $\eta_{mh}$ , z.B. 0,85 festgelegt werden muß;

$\eta_d$ : dynamischen Wirkungsgrad des Getriebes auf 0.94 festlegen.

- Den Wert der für die Versorgung des Hydraulikmotors erforderlichen Förderleistung  $Q$ , unter Anwendung der folgenden Formel, kalkulieren:

pour  $\eta_{mh}$ , on peut fixer par ex. 0,85;

$\eta_d$ : rendement dynamique réducteur fixer 0.94.

- Calculer la valeur du débit  $Q$ , nécessaire pour alimenter le moteur hydraulique, avec la formule :

wo für  $\eta_v$ , z.B. 0,90 festgelegt werden muß.

- Die Baugröße des Getriebes mit  $M_{r2}$  wählen. Siehe dazu "Wahl des Getriebes" auf Seite 29.

- Das Diagramm (A15) des Getriebemotors mit äquivalentem Hubraumwert  $v_{eq}$  zur Hand nehmen und gleichzeitig folgendes wählen:
  - denjenigen Motor, der die Bedingungen des geforderten  $p$  int. und  $Q$  int. erfüllt.
  - den Anhaltswert des Untersetzungsverhältnis  $i$ , wobei berücksichtigt werden muß, daß dieser mit einer Mindestzahl an Untersetzungsstufen verwirklicht wird, um so den kostengünstigsten Getriebemotor in einem kompakten Maß zu erhalten.
 Mit dem Wert  $M_2$  und dem Anhaltswert  $i$ , kann man nun die entsprechende Wahl treffen und das Getriebe gemäß der Angaben im Kap.14 überprüfen.

ou pour  $\eta_v$  il faut fixer par exemple 0,90.

- Choisir la taille du réducteur avec  $M_{r2}$ . Se reporter à la sélection du réducteur à la page 29.

- Entrer dans le diagramme (A15) du motoréducteur avec la valeur de cylindrée équivalente  $V_{eq}$  et choisir parallèlement:
  - le moteur satisfaisant aux conditions de  $p$  int. et  $Q$  int nécessaires;
  - la valeur indicative du rapport de réduction  $i$ , compte tenu que cela est réalisé avec un nombre d'étages de réduction minimum, de manière à obtenir un réducteur ayant un coût aussi bas que possible et une dimension compacte.
 Avec la valeur de  $M_2$  et la valeur indicative de  $i$ , procéder à la sélection et à la vérification du réducteur suivant les indications du chapitre 14.

### 31.0 VERIFICHE

Verificare poi che i valori di pressione, portata, rendimenti trovino corrispondenza con quelli riportati sulla Tab. (A16) dei dati tecnici motori.

### 31.0 CHECKING

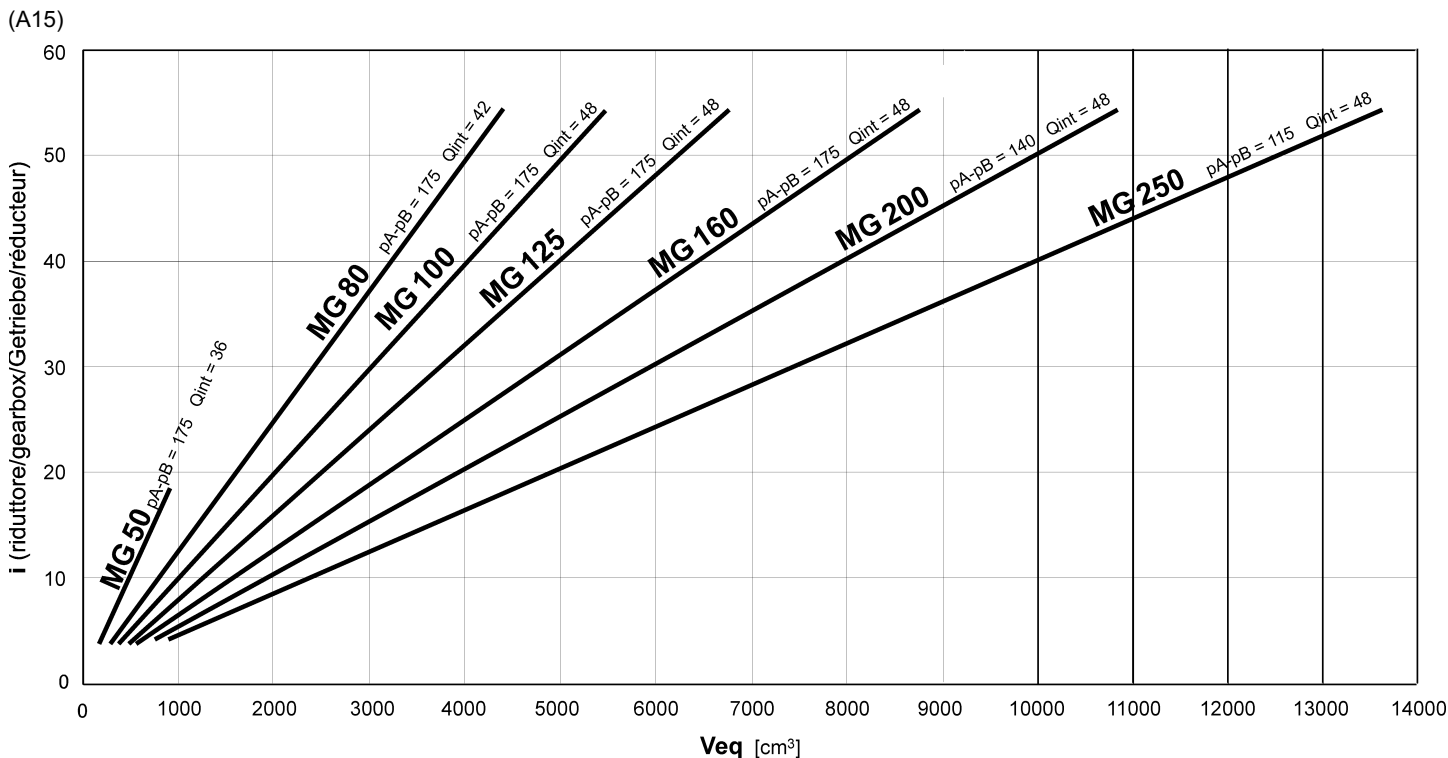
Check that pressure, efficiency and flow rate values correspond with values indicated in Table (A16) on motor technical features.

### 31.0 ÜBERPRÜFUNGEN

Daraufhin ist zu überprüfen, ob die Werte des Drucks, der Förderleistung, der Wirkungsgrade, mit den auf der Tabelle der technischen Motordaten (A16) eingetragenen Werten übereinstimmen.

### 31.0 VERIFICATIONS

Vérifier ensuite que les valeurs de pression, débit, rendements correspondent aux indications du Tableau (A16) des données techniques moteurs.

32.0 DATI TECNICI  
MOTORI MG32.0 TECHNICAL DATA MG  
MOTORS32.0 MG MOTORAUSWAHL-  
TABELLEN32.0 CARACTERISTIQUES  
TECHNIQUES  
MOTEURS MG

(A16)

|                    |                       |                                |                   |                | MG 50 | MG 80 | MG 100 | MG 125 | MG 160 | MG 200 | MG 250 |
|--------------------|-----------------------|--------------------------------|-------------------|----------------|-------|-------|--------|--------|--------|--------|--------|
| Cilindrata         | Displacement          | Hubraum                        | Cilindrée         | [ $cm^3$ ]     | 49.2  | 81.9  | 101.6  | 126.2  | 162.2  | 201.6  | 252.4  |
| pmax alimentazione | Suction pmax          | pmax Speisung                  | pmax alimentation | [bar]          | 175   | 175   | 175    | 175    | 175    | 140    | 140    |
| pA-pB continuo     | pA-pB continuous      | pA-pB kontinuierlich           | pA-pB continu     | [bar]          | 140   | 140   | 140    | 140    | 130    | 110    | 90     |
| pA-pB int. 1)      | pA-pB int. 1)         | pA-pB Schaltbetrieb 1)         | pA-pB int. 1)     | [bar]          | 175   | 175   | 175    | 175    | 175    | 140    | 115    |
| pA-pB picco 2)     | pA-pB peak 2)         | pA-pB Spitze 2)                | pA-pB de crête 2) | [bar]          | 200   | 200   | 200    | 200    | 200    | 170    | 140    |
| Portata continuo   | Flow rate, continuous | Kont. Durchflußleistung        | Débit continu     | [l/min]        | 30    | 35    | 40     | 40     | 40     | 40     | 40     |
| Portata int. 1)    | Flow rate int. 1)     | Durchflußleistung - Schalt. 1) | Débit int. 1)     | [l/min]        | 36    | 42    | 48     | 48     | 48     | 48     | 48     |
| Coppia cont.       | Cont. torque          | Kontinuierliches Drehmoment    | Couple cont.      | [Nm]           | 98    | 157   | 190    | 236    | 279    | 289    | 296    |
| Coppia int. 1)     | Int. torque 1)        | Drehmoment - Schalt. 1)        | Couple int. 1)    | [Nm]           | 122   | 196   | 238    | 295    | 375    | 368    | 379    |
| Coppia picco 2)    | Peak torque 2)        | Spitzendrehmoment 2)           | Couple crête 2)   | [Nm]           | 139   | 224   | 272    | 237    | 429    | 447    | 461    |
| Velocità cont.     | Cont. speed           | Kont. Drehzahl                 | Vitesse cont.     | [ $min^{-1}$ ] | 567   | 402   | 374    | 301    | 237    | 190    | 152    |
| Velocità int. 1)   | Int. speed 1)         | Drehzahl - Schaltbetrieb 1)    | Vitesse int. 1)   | [ $min^{-1}$ ] | 680   | 477   | 439    | 361    | 284    | 229    | 183    |
| Velocità min.      | Min. speed            | Min. Drehzahl                  | Vitesse min.      | [ $min^{-1}$ ] | 12    | 12    | 12     | 11     | 10     | 8      | 8      |
| Potenza cont.      | Cont. power           | Kont. Leistung                 | Puissance cont.   | [kW]           | 5.7   | 6.6   | 7.4    | 7.4    | 6.9    | 5.7    | 4.7    |
| Potenza int. 1)    | Int. power 1)         | Leistung-Schaltbetrieb 1)      | Puissance int. 1) | [kW]           | 6.5   | 7.0   | 8.0    | 8.0    | 7.0    | 6.5    | 5.0    |

1) Valore intermittente: i valori in tabella si intendono per un massimo del 10% ogni minuto.

1) Intermittent duty value: the values in the table are referred to 10% every minute maximum.

1) Wert im Schaltbetrieb: die in der Tabelle aufgeführten Werte beziehen sich auf einen Maximalwert von 10% pro Minute.

1) Valeur intermittente: les valeurs du tableau s'entendent pour un maximum de 10% toutes les minutes.

2) Valore di picco: i valori in tabella si intendono per un massimo del 1% ogni minuto.

2) Peak value: the values in the table are referred to 1% every minute maximum.

2) Spitzenwert: die auf der Tabelle aufgeführten Werte beziehen sich auf einen Maximalwert von 1% pro Minute.

2) Valeur de crête: les valeurs du tableau s'entendent pour un maximum de 1% toutes les minutes.

(A17)

|             |     | MG 50   |    |    |    | MG 80   |    |    |    | MG 100  |    |    |    | MG 125  |    |    |    | MG 160  |    |    |    | MG 200  |    |    |    | MG 250  |    |    |    |
|-------------|-----|---------|----|----|----|---------|----|----|----|---------|----|----|----|---------|----|----|----|---------|----|----|----|---------|----|----|----|---------|----|----|----|
|             | P   | Q l/min |    |    |    | Q l/min |    |    |    | Q l/min |    |    |    | Q l/min |    |    |    | Q l/min |    |    |    | Q l/min |    |    |    | Q l/min |    |    |    |
|             | bar | 5       | 10 | 20 | 30 | 10      | 20 | 30 | 35 | 10      | 20 | 30 | 40 | 10      | 20 | 30 | 40 | 10      | 20 | 30 | 40 | 10      | 20 | 30 | 40 | 10      | 20 | 30 | 40 |
| $\eta_{mh}$ | 50  | 82      | 80 | 78 | 77 | 81      | 78 | 75 | 73 | 80      | 75 | 71 | 70 | 80      | 75 | 71 | 69 | 79      | 74 | 71 | 69 | 78      | 74 | 70 | 68 | 78      | 74 | 70 | 68 |
|             | 80  | 86      | 84 | 82 | 79 | 84      | 81 | 77 | 75 | 82      | 77 | 74 | 72 | 82      | 77 | 74 | 72 | 82      | 77 | 73 | 70 | 81      | 75 | 72 | 69 | 81      | 75 | 71 | 68 |
|             | 110 | 88      | 86 | 84 | 82 | 85      | 83 | 81 | 79 | 83      | 80 | 76 | 74 | 83      | 80 | 76 | 74 | 83      | 78 | 75 | 72 | 82      | 77 | 74 | 70 | 82      | 77 | 72 | 70 |
|             | 140 | 89      | 88 | 86 | 84 | 86      | 84 | 82 | 80 | 84      | 82 | 77 | 75 | 84      | 82 | 77 | 75 | 82      | 80 | 76 | 74 | 81      | 78 | 75 | 73 |         |    |    |    |
| $\eta_v$    | 170 | 88      | 88 | 87 | 86 | 85      | 85 | 83 | 81 | 82      | 80 | 78 | 76 | 82      | 80 | 78 | 76 | 82      | 79 | 77 | 75 |         |    |    |    |         |    |    |    |
|             | 50  | 90      | 92 | 93 | 93 | 91      | 92 | 94 | 94 | 93      | 94 | 95 | 95 | 93      | 94 | 95 | 95 | 93      | 94 | 95 | 96 | 93      | 94 | 95 | 96 | 93      | 94 | 95 | 96 |
|             | 80  | 89      | 90 | 92 | 93 | 89      | 90 | 91 | 93 | 91      | 93 | 94 | 95 | 91      | 94 | 94 | 95 | 91      | 94 | 95 | 95 | 91      | 94 | 94 | 95 | 91      | 94 | 94 | 95 |
|             | 110 | 88      | 89 | 90 | 92 | 87      | 89 | 90 | 92 | 90      | 92 | 93 | 94 | 90      | 91 | 92 | 94 | 90      | 91 | 92 | 94 | 90      | 91 | 92 | 94 | 90      | 91 | 92 | 94 |
|             | 140 | 85      | 88 | 89 | 90 | 85      | 89 | 90 | 90 | 85      | 90 | 91 | 92 | 86      | 87 | 90 | 91 | 87      | 88 | 90 | 91 | 87      | 88 | 91 | 93 |         |    |    |    |
|             | 170 | 81      | 84 | 88 | 89 | 81      | 94 | 88 | 89 | 82      | 85 | 89 | 90 | 83      | 85 | 89 | 91 | 84      | 85 | 89 | 92 |         |    |    |    |         |    |    |    |

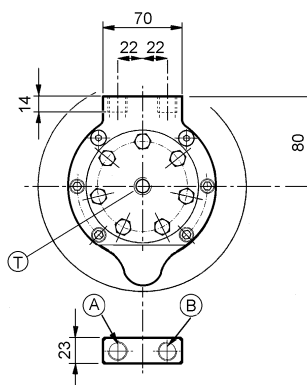
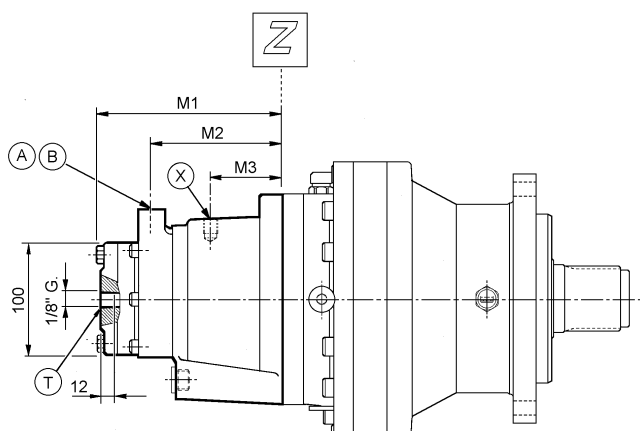
33.0 **DIMENSIONI**  
**MOTORI MG**

33.0 **DIMENSIONS**  
**MG MOTORS**

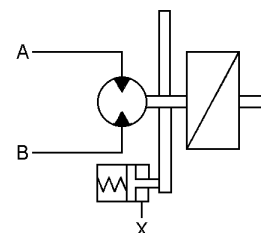
33.0 **ABMESSUNGEN**  
**MOTOREN MG**

33.0 **DIMENSIONS**  
**MOTEURS MG**

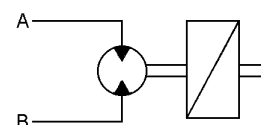
**MG-\*\*\*ZA\*\*-P01S**



Con freno / with brake  
mit Bremse / avec frein

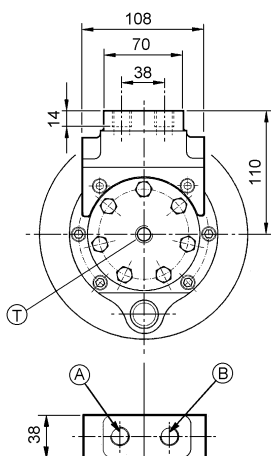
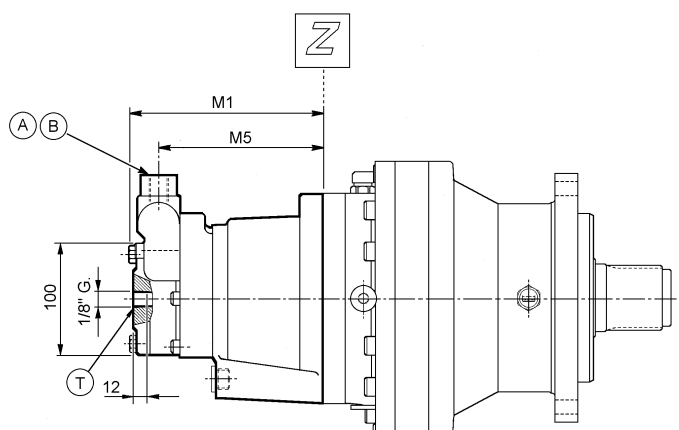


Senza freno / without brake  
ohne Bremse / sans frein

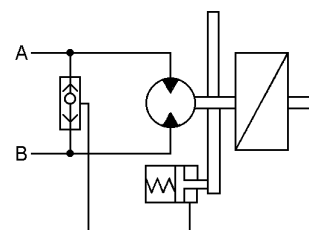


**ATTACCHI / PORTS**  
**ANSCHLUSSE / RACCORDS**  
A - B = 3/8" G 19TPI  
T = 1/8" G 28TPI  
X = 1/4 G 19TPI

**MG-\*\*\*ZA\*\*-B02P**



Con freno / with brake  
mit Bremse / avec frein



| Riduttore applicabile<br>Suitable gearbox<br>Anbaugetriebe<br>Réducteur applicable | Motore / Motor / Motor / Moteur |       |        |        |        |        |        | Esecuzione / Execution<br>Ausführung / Exécution |    |      |
|------------------------------------------------------------------------------------|---------------------------------|-------|--------|--------|--------|--------|--------|--------------------------------------------------|----|------|
|                                                                                    | MG 50                           | MG 80 | MG 100 | MG 125 | MG 160 | MG 200 | MG 250 | P01S                                             |    |      |
|                                                                                    | M1                              |       |        |        |        |        |        | M2                                               | M3 | B02P |
| 300 L1 - L2 - R2                                                                   | 156                             | 162   | 166    | 170    | 177    |        |        | 113                                              | 60 | 143  |
| 301 L1 - L2 - R2                                                                   | 156                             | 162   | 166    | 170    | 177    | 184    | 193    | 113                                              | 60 | 143  |
| 303 L1                                                                             |                                 |       |        |        | 199    | 206    | 215    | 135                                              | 77 | 165  |
| 303 L2 - R2                                                                        | 156                             | 162   | 166    | 170    | 177    | 184    | 193    | 113                                              | 60 | 143  |
| 305 L1                                                                             |                                 |       |        |        | 199    | 206    | 215    | 135                                              | 77 | 165  |
| 305 L2 - R2                                                                        | 156                             | 162   | 166    | 170    | 177    | 184    | 193    | 113                                              | 60 | 143  |
| 306 L2                                                                             |                                 |       |        |        | 199    | 206    | 215    | 135                                              | 77 | 165  |
| 306 R2 - R3                                                                        | 156                             | 162   | 166    | 170    | 177    | 184    | 193    | 113                                              | 60 | 143  |
| 307 L2                                                                             |                                 |       |        |        | 199    | 206    | 215    | 135                                              | 77 | 165  |
| 307 R2 - R3                                                                        | 156                             | 162   | 166    | 170    | 177    | 184    | 193    | 113                                              | 60 | 143  |

**34.0 DATI TECNICI FRENI  
PER MOTORI MG**
**34.0 TECHNICAL DATA-  
BRAKES FOR  
MG MOTORS**
**34.0 TECHNISCHE DATEN-  
BREMSEN FÜR MG-  
MOTOREN**
**34.0 DONNÉE TECHNIQUES  
FREINS DE  
MOTEURS MG**

(A18)

|                                                                                                                                                       | Freno/Brake/Bremse/Frein<br>TYPE 3. |      |      |      | Freno/Brake/Bremse/Frein<br>TYPE 4. |      |      |      |      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------|------|------|-------------------------------------|------|------|------|------|
|                                                                                                                                                       | 3E                                  | 3I   | 3L   | 3N   | 4K                                  | 4N   | 4R   | 4U   |      |
| Coppia frenante Mf<br>Brake torque Mf<br>Bremsmoment Mf<br>Couple de freinage Mf                                                                      | [Nm]                                | 120  | 200  | 280  | 350                                 | 260  | 320  | 430  | 620  |
| Pressione minima apertura<br>Min. opening pressure<br>Min. öffnungsdruck<br>Pression minimale ouverture                                               | [bar]                               | 16   | 28   | 28   | 35                                  | 25   | 30   | 24   | 34   |
| Pressione massima di comando<br>Max. operating pressure<br>Max. steuerdruck<br>Pression maximale de commande                                          | [bar]                               | 200  |      |      |                                     |      |      |      |      |
| Volume d'olio per comando apertura freno<br>Oil volume for brake release<br>Ölvolumen für öffnungssteuerung<br>Volume d'huile pour commande ouverture | [cc]                                | 6.43 | 6.43 | 6.43 | 6.43                                | 6.65 | 6.65 | 6.65 | 6.65 |

(A19)

| Riduttore applicabile<br>Suitable gearbox<br>Anbaugesetze<br>Réducteur applicable | Motore / Motor / Motor / Moteur |                                                                                    |            |                                                                                    |            |                                                                                    |            |                                                                                    |            |                                                                                      |            |                                                                                      |            |                                                                                      |
|-----------------------------------------------------------------------------------|---------------------------------|------------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------------------|
|                                                                                   | MG 50                           |                                                                                    | MG 80      |                                                                                    | MG 100     |                                                                                    | MG 125     |                                                                                    | MG 160     |                                                                                      | MG 200     |                                                                                      | MG 250     |                                                                                      |
|                                                                                   | Mf<br>[Nm]                      |  | Mf<br>[Nm] |  | Mf<br>[Nm] |  | Mf<br>[Nm] |  | Mf<br>[Nm] |  | Mf<br>[Nm] |  | Mf<br>[Nm] |  |
| 300 L1 - L2                                                                       | 120                             | 3E                                                                                 | 200        | 3I                                                                                 | 280        | 3L                                                                                 | 350        | 3N                                                                                 | 350        | 3N                                                                                   |            |                                                                                      |            |                                                                                      |
| 300 R2                                                                            | 120                             | 3E                                                                                 | 200        | 3I                                                                                 | 280        | 3L                                                                                 |            |                                                                                    |            |                                                                                      |            |                                                                                      |            |                                                                                      |
| 301 L1 - L2                                                                       |                                 |                                                                                    | 200        | 3I                                                                                 | 280        | 3L                                                                                 | 350        | 3N                                                                                 | 350        | 3N                                                                                   | 350        | 3N                                                                                   | 350        | 3N                                                                                   |
| 301 R2                                                                            | 120                             | 3E                                                                                 | 200        | 3I                                                                                 | 280        | 3L                                                                                 | 350        | 3N                                                                                 | 350        | 3N                                                                                   |            |                                                                                      |            |                                                                                      |
| 303 L1                                                                            |                                 |                                                                                    |            |                                                                                    |            |                                                                                    |            |                                                                                    | 430        | 4R                                                                                   | 430        | 4R                                                                                   | 430        | 4R                                                                                   |
| 303 L2                                                                            | 120                             | 3E                                                                                 | 200        | 3I                                                                                 | 280        | 3L                                                                                 | 350        | 3N                                                                                 | 350        | 3N                                                                                   | 350        | 3N                                                                                   |            |                                                                                      |
| 303 R2                                                                            | 120                             | 3E                                                                                 | 200        | 3I                                                                                 | 280        | 3L                                                                                 | 350        | 3N                                                                                 | 350        | 3N                                                                                   | 350        | 3N                                                                                   |            |                                                                                      |
| 305 L1                                                                            |                                 |                                                                                    |            |                                                                                    |            |                                                                                    |            |                                                                                    | 430        | 4R                                                                                   | 430        | 4R                                                                                   | 430        | 4R                                                                                   |
| 305 L2                                                                            | 120                             | 3E                                                                                 | 200        | 3I                                                                                 | 280        | 3L                                                                                 | 350        | 3N                                                                                 | 350        | 3N                                                                                   | 350        | 3N                                                                                   |            |                                                                                      |
| 305 R2                                                                            | 120                             | 3E                                                                                 | 200        | 3I                                                                                 | 280        | 3L                                                                                 | 350        | 3N                                                                                 | 350        | 3N                                                                                   | 350        | 3N                                                                                   |            |                                                                                      |
| 306 L2                                                                            |                                 |                                                                                    | 260        | 4K                                                                                 | 260        | 4K                                                                                 | 320        | 4R                                                                                 | 430        | 4R                                                                                   | 430        | 4R                                                                                   | 430        | 4R                                                                                   |
| 306 R2 - R3                                                                       |                                 |                                                                                    | 200        | 3I                                                                                 | 280        | 3L                                                                                 | 350        | 3N                                                                                 | 350        | 3N                                                                                   | 350        | 3N                                                                                   |            |                                                                                      |
| 307 L2                                                                            |                                 |                                                                                    |            |                                                                                    | 260        | 4K                                                                                 | 320        | 4R                                                                                 | 430        | 4R                                                                                   | 430        | 4R                                                                                   | 430        | 4R                                                                                   |
| 307 R2 - R3                                                                       |                                 |                                                                                    | 200        | 3I                                                                                 | 280        | 3L                                                                                 | 350        | 3N                                                                                 | 350        | 3N                                                                                   | 350        | 3N                                                                                   | 350        | 3N                                                                                   |

**35.0 INSTALLAZIONE**
**35.0 INSTALLATION**
**35.0 INSTALLATION**
**35.0 INSTALLATION**

In aggiunta alle norme relative alla installazione del riduttore, vedi pag. 18, è raccomandato seguire le seguenti norme per l'installazione del motore idraulico.

Further to standards on gearbox installation, refer to page 18, comply with the following hydraulic motor installation instructions:

Zusätzlich zu den Normen für die Vorgangsweise bei der Installation des jeweiligen Getriebes, siehe Seite 18, wird empfohlen, die auch folgenden Anweisungen für die Installation des Hydraulikmotors zu befolgen.

En plus des règles concernant l'installation du réducteur, voir page 18, on préconise de suivre les instructions ci-dessous pour l'installation du moteur hydraulique.

**a) Collegamento al circuito idraulico**
**a) Connection to the hydraulic circuit**
**a) Anschluß an den hydraulischen Kreislauf**
**a) Raccordement au circuit hydraulique**

I motori possono essere collegati sia a circuiti del tipo chiuso che aperto.  
Nel caso di circuito aperto la elettrovalvola o distributore di comando può essere sia di tipo a centro chiuso che aperto.

Motors can be connected either to closed or open circuits.  
In case of an open circuit, solenoid valve or control distributor can be of the closed or open center type.

Die Motoren können, sowohl an geschlossene, als auch an offene Kreisläufe verwendet werden.  
Handelt es sich um einen offenen Kreislauf kann das Elektroventil oder das Steuerwegeteil, sowohl vom Typ mit geschlossener Mitte, als auch mit offener Mitte sein.

Les moteurs peuvent être raccordés à des circuits de type fermé aussi bien qu'ouvert.  
En cas de circuit ouvert, l'électrovanne, ou distributeur de commande, peut être de type tant à centre fermé qu'ouvert.

Occorre che nel ramo del circuito corrispondente alla mandata del motore idraulico sia sempre montata una valvola di massima pressione tarata ad un valore non superiore al valore  $p_{int}$  ammesso sul motore idraulico. Vedi schemi idraulici (A20).

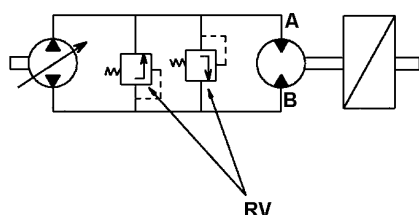
The hydraulic motor delivery side should always have a max. pressure valve set to a value not exceeding the  $p_{int}$  value allowed for the hydraulic motor. See hydraulic diagrams (A20).

Es ist erforderlich, daß am Zweig des Kreislaufs, gegenüber der Druckleitung des Hydraulikmotors immer ein Druckbegrenzungsventil montiert ist, welches auf einen Wert geeicht ist, der den am Hydraulikmotor zulässigen Wert von  $p_{int}$  nicht überschreitet. Siehe Hydraulikpläne (A20).

Il y a lieu que la portion de circuit, correspondant à l'alimentation du moteur hydraulique, soit toujours équipée d'un détendeur de surpression taré à une valeur pas supérieure à  $p_{int}$  maximale admise sur le moteur hydraulique. Voir schémas hydrauliques (A20).

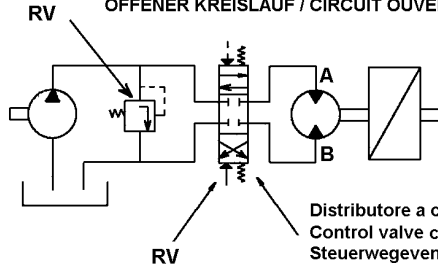
(A20)

**CIRCUITO CHIUSO / CLOSED LOOP CIRCUIT  
GESCHLOSSENER KREISLAUF / CIRCUIT FERME**

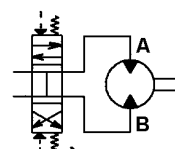


RV = valvole di massima pressione tarate a  $p_{RV} < p_{max}$   
RV = Max pressure valve set to a  $p_{RV} < p_{max}$   
RV = Druckbegrenzungsventile, geeicht auf  $p_{RV} < p_{max}$   
RV = détendeur de surpression taré à  $p_{RV} < p_{max}$

**CIRCUITO APERTO / OPEN LOOP CIRCUIT  
OFFENER KREISLAUF / CIRCUIT OUVERT**



Distributore a centro chiuso Control valve  
Control valve closed center type  
Steuerweventil mit Geschlossener Mitte  
Distributeur à centre fermé



Distributore a centro aperto Control valve open center type  
Steuerweventil mit Offener Mitte  
Distributeur à centre ouvert

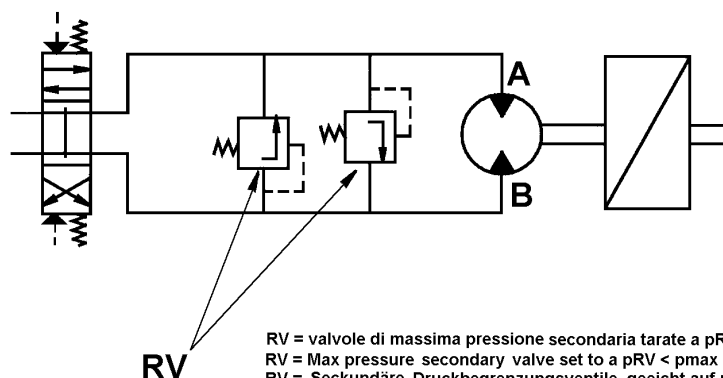
Nel caso in cui questo non sia possibile in quanto il circuito deve comandare altri azionamenti a pressione più elevata e/o nel caso cui si abbia un distributore a centro chiuso ed il motore aziona organi ad elevato momento d'inerzia occorre montare valvole di massima pressione secondarie il più vicino possibile al motore. Vedi schema (A21).

If not possible, because the circuits control other devices needing a higher pressure and/or a closed center control valve is fitted and the motor controls parts with a high moment of inertia, max. pressure secondary valves should be as close as possible to the motor. See diagram (A21).

Ist dies nicht möglich, weil der Kreislauf noch andere, unter höheren Druck stehende Antriebe steuern muß und/oder in dem Fall, daß kein Wegeventil mit geschlossener Mitte zur Verfügung steht und der Motor Organe mit einem erhöhten Trägheitsmoment antreibt, muß man so nahe wie möglich am Motor sekundäre Druckbegrenzungsventile montieren. Siehe Schema (A21).

Si cela n'est pas possible, du fait que le circuit doit commander d'autres entraînements, ayant une pression plus élevée, et/ou qu'il y a un distributeur à centre fermé et le moteur actionne des organes, ayant un moment d'inertie élevé, il faut monter des détendeurs de surpression secondaires, le plus près du moteur. Voir schéma (A21).

(A21)



RV = valvole di massima pressione secondaria tarate a  $p_{RV} < p_{max}$   
RV = Max pressure secondary valve set to a  $p_{RV} < p_{max}$   
RV = Sekundäre Druckbegrenzungsventile, geeicht auf  $p_{RV} < p_{max}$   
RV = détendeur de surpression secondaires taré à  $p_{RV} < p_{max}$

**b) Collegamento foro di drenaggio T**

In esecuzione standard i motori vengono forniti senza foro di drenaggio. In questo caso il motore è provvisto di drenaggio interno. Questo soddisfa la maggioranza delle applicazioni dove il funzionamento è intermittente e la pressione media di comando è inferiore al 50% della pressione sopportabile dal motore. Quando il funzionamento è in continuo o intermittente con una percentuale di funzionamento maggiore del 50% e la pressione media di comando è superiore al 50% della pressione, occorre richiedere il motore in esecuzione con drenaggio esterno e collegare il foro di drenaggio T al serbatoio.

**b) Connection of drain hole T**

Standard motors are supplied with no drain hole. In this case, the motor has an internal drain system. This meets most application requirements with intermittent duty and average control pressure under 50% of the max. pressure bearable by the motor. In continuous or intermittent duty with operation percentage over 50% and average control pressure over 50% of the max. pressure, motor should be ordered in the external drain version and the drain hole T should be connected to the tank.

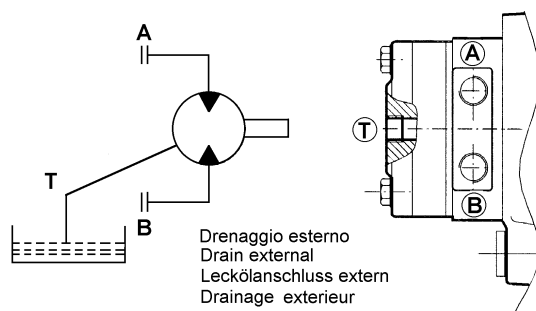
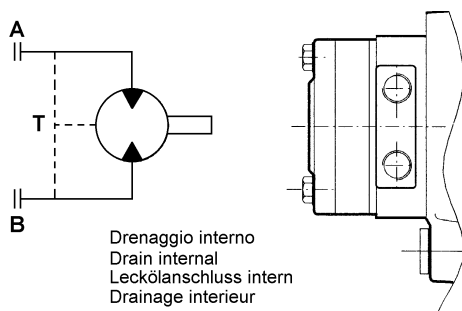
**b) Anschlüsse an der Drainagebohrung T**

In der Standardausführung werden die Motoren ohne Drainagebohrung geliefert. Diese Lösung reicht bei den meisten Applikationsfällen, bei denen ein Schaltbetrieb verwendet wird und der mittlere Steuerdruck unter den 50% des max. vom Motor tragbaren Drucks liegt, aus. Handelt es sich um einen Dauer- oder einen Schaltbetrieb mit einem Betriebsprozentsatz über 50% und der mittlere Steuerdruck liegt über 50% des Drucks, muß man eine Motorausführung mit einer Außendrainage anfordern und die Drainagebohrung T dann mit dem Tank verbinden.

**b) Raccordement orifice de purge T**

L'exécution standard des moteurs ne prévoit pas d'orifice de purge. Dans ce cas le moteur est dépourvu de purge intérieure. Cela satisfait à la plupart des applications où le fonctionnement est intermittent et la pression moyenne de commande est inférieure à 50% de la pression maximale admise pour le moteur. Si le fonctionnement est continu ou intermittent, avec un pourcentage de fonctionnement supérieur à 50% et la pression moyenne de commande est supérieure à 50% de la pression, il faut commander le moteur dans la variante avec purge extérieure et raccorder l'orifice de purge T au réservoir.

(A22)



**c) Comando freno**

Nel caso in cui il motoriduttore sia dotato di freno, il motore può essere in due esecuzioni: B02P oppure P01S. Nella esecuzione B02P, il comando del freno è interno, diretto dal motore. Nella esecuzione P01S, occorre un ramo ausiliario per il comando del freno. Vedere lo schema seguente (A23).

**c) Brake control**

For gearmotors equipped with brakes, there are two motor versions available, i.e. the B02P or P01S executions. In the B02P version, the motor has an in-built, direct brake control system. In the P01S version, an auxiliary branching is required to control the brake. See the following diagram (A23).

**c) Bremssteuerung**

Ist der Getriebemotor mit einer Bremse ausgestattet, können zwei Motorausführungen verwendet werden: B02P oder P01S. Bei der Ausführung B02P liegt die Bremssteuerung im Inneren und wird vom Motor gesteuert. Bei der Ausführung P01S ist für die Bremssteuerung eine Hilfsüberzweigung erforderlich. Siehe dazu folgendes Schema (A23).

**c) Commande frein**

Au cas où le motoréducteur serait équipé de frein, le moteur pourra avoir deux exécutions: B02P ou P01S. Dans l'exécution B02P, la commande du frein est à l'intérieur, derrière le moteur. Dans l'exécution P01S, il faut disposer d'une branche auxiliaire pour la commande du frein. Voir schéma suivant (A23).

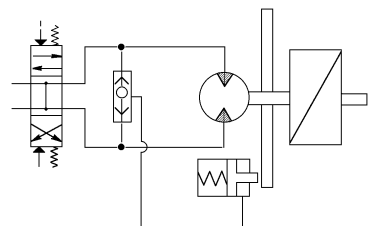
(A23)

**CIRCUITO APERTO / OPEN LOOP CIRCUIT  
OFFENER KREISLAUF / CIRCUIT OUVERT**

Distributore a centro aperto  
Control valve open center type  
Steuerwegeventil mit offener Mitte  
Distributeur à centre ouvert

Esecuzione motore  
Motor execution  
Motorausführung  
Exécution moteur

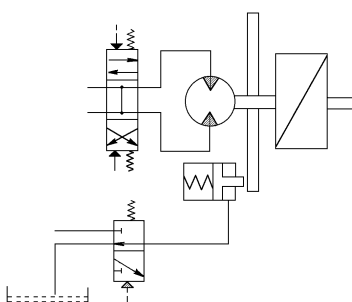
**B02P**



Distributore a centro chiuso  
Control valve closed center type  
Steuerwegeventil mit geschlossener Mitte  
Distributeur à centre fermé

Esecuzione motore  
Motor execution  
Motorausführung  
Exécution moteur

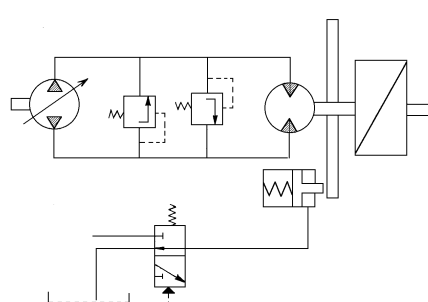
**P01S**



**CIRCUITO CHIUSO / CLOSED LOOP CIRCUIT  
GESCHLOSSENER KREISLAUF / CIRCUIT FERME**

Esecuzione motore  
Motor execution  
Motorausführung  
Exécution moteur

**P01S**



| d) Tipo olio idraulico                                                                                                                                                                                                                                                  | d) Hydraulic oil                                                                                                                                                                                                                              | d) Hydrauliköltyp                                                                                                                                                                                                                                                                            | d) Type d'huile hydraulique                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>È raccomandato l'uso di olio idraulico minerale con viscosità ISO VG 46 (46 Cst a <math>t = 40^{\circ}\text{C}</math>).<br/>E' raccomandabile che la temperatura dell'olio sia compresa fra <math>+30^{\circ}\text{C}</math> e <math>+70^{\circ}\text{C}</math>.</p> | <p>Use hydraulic mineral oil with viscosity ISO VG 46 (46 Cst at <math>t = 40^{\circ}\text{C}</math>).<br/>It is recommended the oil temperature should be between <math>+30^{\circ}\text{C}</math> and <math>+70^{\circ}\text{C}</math>.</p> | <p>Es wird der Einsatz von Mineralhydrauliköl mit einem Viskositätsgrad ISO VG 46 (46 Cst bei <math>t = 40^{\circ}\text{C}</math>) empfohlen.<br/>Die Öltemperatur sollte zwischen <math>+30^{\circ}\text{C}</math> und <math>+70^{\circ}\text{C}</math> liegen.</p>                         | <p>On préconise d'utiliser de l'huile hydraulique minérale avec viscosité ISO VG 46 (46 Cst à <math>t = 40^{\circ}\text{C}</math>).<br/>On préconise que le domaine de température de l'huile soit compris entre <math>+30^{\circ}\text{C}</math> et <math>+70^{\circ}\text{C}</math>.</p> |
| e) Filtraggio                                                                                                                                                                                                                                                           | e) Oil filtering                                                                                                                                                                                                                              | e) Filtrierung                                                                                                                                                                                                                                                                               | e) Filtrage                                                                                                                                                                                                                                                                                |
| <p>Per assicurare un funzionamento affidabile del motore ed una sua durata è estremamente importante che il circuito idraulico sia dotato di filtro con capacità filtrante tale da assicurare un grado di pulizia dell'olio secondo grado:</p>                          | <p>For reliable motor operation and long life, it is important that the hydraulic circuit has a filter for a proper oil filtering according to the following degree:</p>                                                                      | <p>Um einen zuverlässigen Betrieb des Motors und eine lange Lebensdauer zu gewährleisten, ist es besonders wichtig, daß der hydraulische Kreislauf mit einem Filter ausgestattet ist, der eine Filtrierleistung bieten, die einen Ölreinigungsgrad gemäß folgender Angaben sichert Grad:</p> | <p>Pour assurer un fonctionnement fiable du moteur, ainsi que sa longévité, il est extrêmement important que le circuit hydraulique soit équipé de filtre, ayant une capacité de filtration en mesure d'assurer un niveau de propreté de l'huile conforme aux degrés suivants:</p>         |
| <p>grado 9 NAS 1638<br/>grado 6 SAE<br/>grado 18/15 SO DIS 4406</p>                                                                                                                                                                                                     | <p>degree 9 NAS 1638<br/>degree 6 SAE<br/>degree 18/15 SO DIS 4406</p>                                                                                                                                                                        | <p>Grad 9 NAS 1638<br/>Grad 6 SAE<br/>Grad 18/15 SO DIS 4406</p>                                                                                                                                                                                                                             | <p>degré 9 NAS 1638<br/>degré 6 SAE<br/>degré 18/15 SO DIS 4406</p>                                                                                                                                                                                                                        |

## 36.0 SISTEMI AUSILIARI DI RAFFREDDAMENTO

Qualora la potenza meccanica trasmessa sia superiore a quella termica trasmissibile (vedi tabelle dati tecnici riduttori), è possibile fornire il riduttore corredato di centralina di raffreddamento.

## 36.0 SUPPLEMENTARY COOLING SYSTEMS

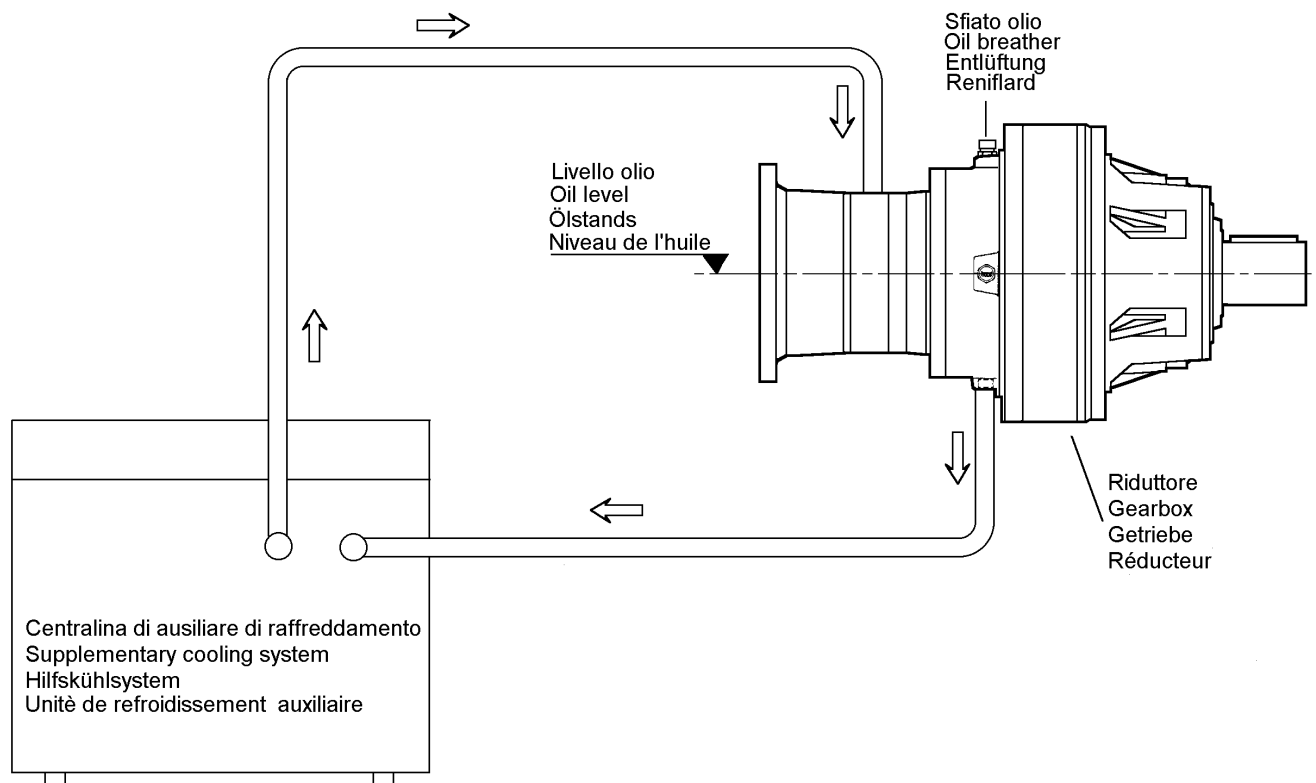
In the event transmitted mechanical power is higher than transmissible thermal power (see tables of gearbox specifications), gearboxes are available complete with a cooling system.

## 36.0 HILFSKÜHLSYSTEME

Sollte die übertragende mechanische Leistung über der übertragbaren Wärmeleistung liegen (siehe Tabelle mit technischen Getriebedaten), ist die Lieferung eines, mit einem Kühlsystem ausgestatteten Get-

## 36.0 SYSTEMES AUXILIAIRES DE REFROIDISSEMENT

Au cas où la puissance mécanique transmise serait supérieure à celle thermique transmissible (confronter tableaux données techniques réducteurs), il est possible de d'équiper le réducteur d'une unité de refroidis-



Le centraline autonome di raffreddamento sono unità composte da uno scambiatore di calore aria-olio, una motopompa, un filtro dell'olio da raffreddare, un elettroventilatore ed un impianto elettrico comprendente la protezione termica dei motori elettrici. Caratteristica delle centraline è il basso livello di rumorosità.

These separate cooling systems are made up of an air-oil heat exchanger, a motor pump, a filter for warm oil and an electric system that incorporates an overload cutout for electric motors. A special feature of these cooling systems is their low noise.

Die autonomen Kühlsysteme sind Einheiten, die sich aus einem Luft-Öl-Wärmeaustauscher, einer Motorpumpe, einem Filter für das zu kühlende Öl, einem Elektroventilator und einer elektrischen Anlage, welche den Wärmeschutz der Elektromotoren enthält, zusammensetzen.

Les unités indépendantes de refroidissement sont des sous-ensembles se composant d'un échangeur de chaleur air/huile, d'une motopompe, d'un filtre pour l'huile à refroidir, d'un électroventilateur et d'un système électrique incluant une protection thermique des moteurs électriques. Cette unité est caractérisée par un bas niveau de nuisance sonore.

### 36.1 Dati tecnici

### 36.1 Technical data

### 36.1 Technische daten

### 36.1 Donnée techniques

|                                                                                                             |         | CR1  | CR2  | CR3  |
|-------------------------------------------------------------------------------------------------------------|---------|------|------|------|
| Potenza assorbita<br>Power absorption<br>Leistungsaufn<br>Puissance absorbée                                | [kW]    | 0.25 | 0.63 | 1    |
| Portata pompa<br>Pumpflow<br>Pumpeausflussmenge<br>Débit de pompe                                           | [l/min] | 9    | 25   | 40   |
| Portata aria<br>Air flow<br>Luftausflussmenge<br>Débit d'air                                                | [m³/h]  | 600  | 1000 | 3000 |
| Livello di rumorosità a 1 metro<br>Level of noise at 1 mt.<br>Geräuschpegel<br>Niveau sonore à 1 in 1 mètre | [dB(A)] | 67   | 71   | 76   |
| Peso<br>Weight<br>Gewicht<br>Poids                                                                          | [Kg]    | 28   | 40   | 63   |

### 36.2 Criteri di scelta

Nota la potenza da trasmettere P e verificato che questa sia superiore alla potenza termica Pt, calcolare la potenza da smaltire Ps con la formula:

### 36.2 Selection criteria

Power P to be transmitted is known. Once you have determined that it is higher than thermal power Pt, calculate excess power Ps using this formula:

$$Ps = 0.1 \cdot (P - Pt) \quad (36)$$

### 36.2 Auswahlkriterien

Hat man einmal die Date der zu übertragenden Leistung P zur Verfügung stehen und überprüft, ob diese über der Wärmeleistung Pt liegt, muß man die Überleistung Ps unter Anwendung der folgenden Formel berechnen:

### 36.2 Critères de sélection

La puissance P à transmettre connue, et une fois vérifié que celle-ci est supérieure à la puissance thermique Pt, calculer la puissance à éliminer Ps par la formule :

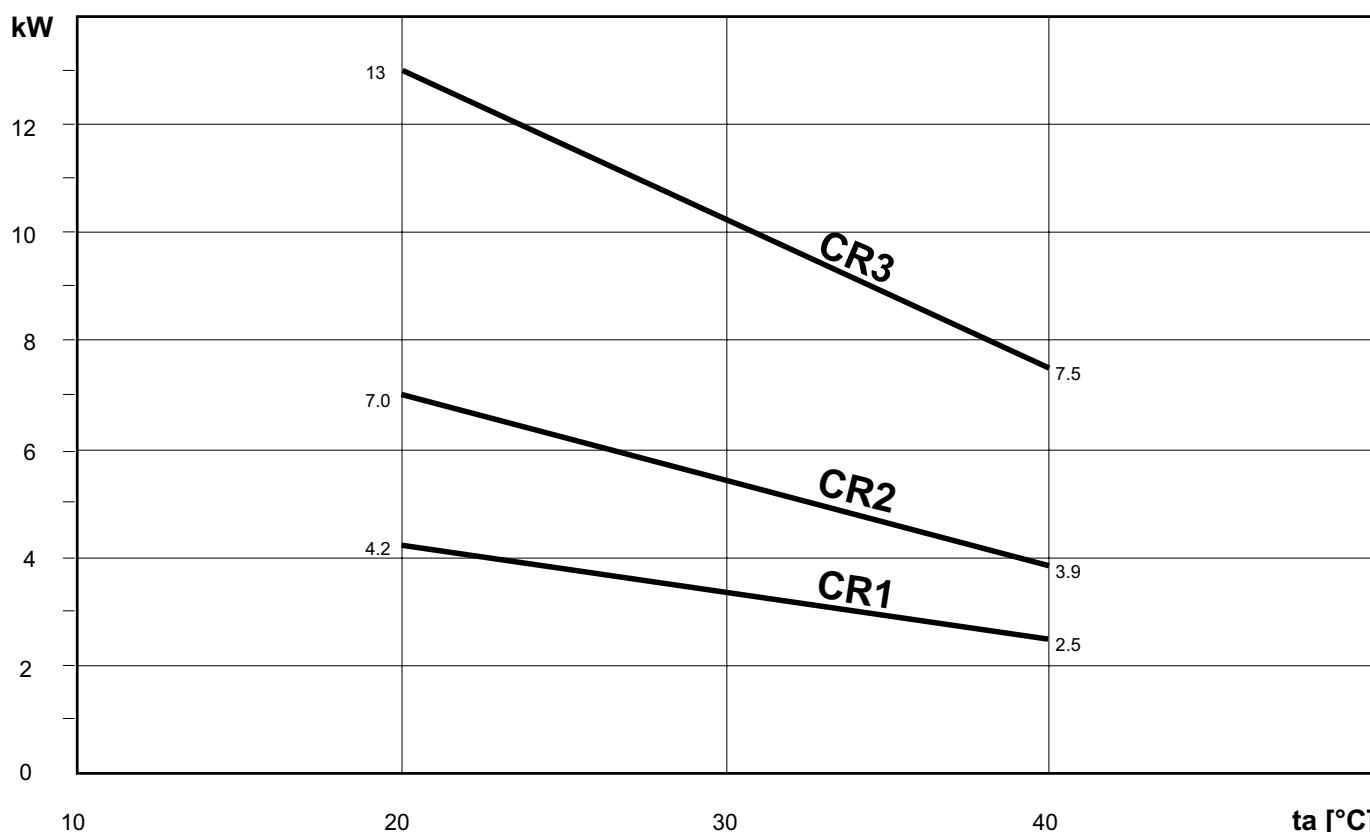
Selezionare la grandezza della centralina sul diagramma (A24) in funzione della temperatura ambiente ta (20° - 40°C). Verificare che la centralina sia installabile sul riduttore selezionato (vedi tabella A25). In caso contrario, contattare la ns. rete di vendita.

Select cooling system size in chart (A24) according to ambient temperature ta (20° - 40°C). Check that the cooling system you have selected will fit the gearbox (see table A25). If this is not the case, contact our sales organization.

Die Größe des Systems auf dem Diagramm (A24) in Anbetracht der Umgebungstemperatur ta (20° - 40°C) auswählen. Überprüfen, ob die Zentrale auch auf dem ausgewählten Getriebe installierbar ist (siehe Tabelle A25). Ist dies nicht der Fall, müssen Sie sich mit unserem Verkaufsnetz in Verbindung setzen.

Sélectionner la taille de l'unité sur le diagramme (A24), se rapportant à la température ambiante (20° - 40°C). Veiller à ce que l'unité puisse être installée sur le réducteur sélectionné (voir tableau A25). Vice versa, contacter notre réseau de vente.

(A24)



(A25)

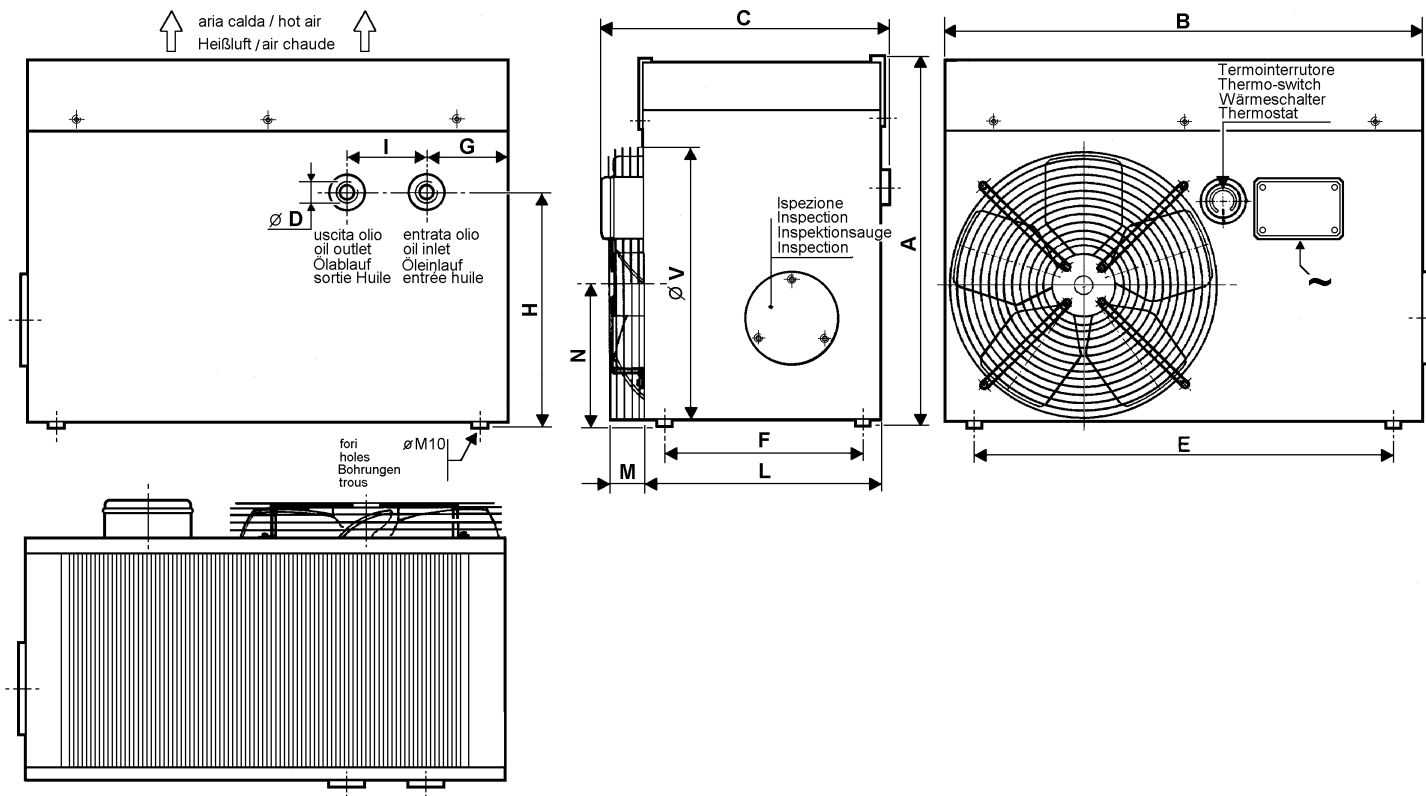
| Riduttore / Gearbox<br>Getriebe / Réducteur | L1  | L2  | L3  | L4  | R2  | R3  | R4 |
|---------------------------------------------|-----|-----|-----|-----|-----|-----|----|
| 306                                         | CR1 | CR1 | —   | —   | —   | —   | —  |
| 307                                         | CR1 | CR1 | —   | —   | CR1 | —   | —  |
| 309                                         | CR1 | CR1 | CR1 | —   | CR1 | —   | —  |
| 310                                         | CR2 | CR1 | CR1 | —   | —   | CR1 | —  |
| 311                                         | CR2 | CR1 | CR1 | —   | CR1 | CR1 | —  |
| 313                                         | CR2 | CR1 | CR1 | —   | CR1 | CR1 | —  |
| 315                                         | CR3 | CR2 | CR1 | —   | CR1 | CR1 | —  |
| 316                                         | CR3 | CR2 | CR1 | —   | CR1 | CR1 | —  |
| 317                                         | CR3 | CR2 | CR2 | CR1 | —   | —   | —  |
| 318                                         | CR3 | CR2 | CR2 | CR1 | —   | —   | —  |
| 319                                         | CR3 | CR2 | CR2 | CR1 | —   | —   | —  |
| 321                                         | CR3 | CR2 | CR2 | CR2 | —   | —   | —  |

36.3 **Dimensioni**

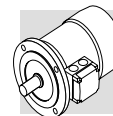
36.3 **Dimensions**

36.3 **Abmessungen**

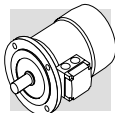
36.3 **Dimensions**



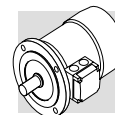
|     | A   | B   | C   | D                       | E   | F   | G   | H   | I   | L   | M  | N   | V   |
|-----|-----|-----|-----|-------------------------|-----|-----|-----|-----|-----|-----|----|-----|-----|
| CR1 | 410 | 490 | 310 | 1/2" G                  | 415 | 190 | 90  | 263 | 80  | 245 | 10 | 158 | 250 |
| CR2 | 463 | 600 | 365 | 3/4 "G                  | 530 | 250 | 100 | 296 | 100 | 300 | 45 | 181 | 300 |
| CR3 | 575 | 760 | 465 | IN = 1"4<br>OUT = 3/4"4 | 690 | 350 | 100 | 408 | 100 | 400 | 45 | 228 | 400 |



**MOTORI ELETTRICI  
ELECTRIC MOTORS  
ELEKTROMOTOREN  
MOTEURS ELECTRIQUES**



| SIMBOLOGIA E UNITÀ DI MISURA |                      | SYMBOLS AND UNITS OF MEASUREMENT                                    | SYMBOLS AND UNITS OF MEASUREMENT                         | SYMBOLS AND UNITS OF MEASUREMENT                                     | SYMBOLS AND UNITS OF MEASUREMENT                                      |
|------------------------------|----------------------|---------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------|-----------------------------------------------------------------------|
| Simb. Symb.                  | U.m. Einheit         | Descrizione                                                         | Description                                              | Beschreibung                                                         | Description                                                           |
| $\cos\varphi$                | –                    | Fattore di potenza                                                  | Power factor                                             | Leistungsfaktor                                                      | Facteur de puissance                                                  |
| $\eta$                       | –                    | Rendimento                                                          | Efficiency                                               | Wirkungsgrad                                                         | Rendement                                                             |
| $f_m$                        | –                    | Fattore correttivo della potenza                                    | Power adjusting factor                                   | Leistungskorrekturfaktor                                             | Facteur de correction de la puissance                                 |
| $I$                          | –                    | Rapporto di intermittenza                                           | Cyclic duration factor                                   | Relative Einschaltdauer                                              | Rapport d'intermittence                                               |
| $I_N$                        | [A]                  | Corrente nominale                                                   | Rated current                                            | Nennstrom                                                            | Courant nominal                                                       |
| $I_S$                        | [A]                  | Corrente di spunto                                                  | Locked rotor current                                     | Kurzschlußstrom                                                      | Courant de démarrage                                                  |
| $J_C$                        | [Kgm <sup>2</sup> ]  | Momento di inerzia del carico                                       | Load moment of inertia                                   | Massenträgheitsmoment der externen Massen                            | Moment d'inertie de la charge                                         |
| $J_M$                        | [Kgm <sup>2</sup> ]  | Momento di inerzia motore                                           | Moment of inertia                                        | Trägheitsmoment                                                      | Moment d'inertie du moteur                                            |
| $K_c$                        | –                    | Fattore di coppia                                                   | Torque factor                                            | Drehmomentfaktor                                                     | Facteur de couple                                                     |
| $K_d$                        | –                    | Fattore di carico                                                   | Load factor                                              | Lastfaktor                                                           | Facteur de charge                                                     |
| $K_J$                        | –                    | Fattore di inerzia                                                  | Inertia factor                                           | Trägheitsfaktor                                                      | Facteur d'inertie                                                     |
| $M_A$                        | [Nm]                 | Coppia accelerante media                                            | Mean breakaway torque                                    | Losbrechmoment                                                       | Couple d'accélération moyen                                           |
| $M_B$                        | [Nm]                 | Coppia frenante                                                     | Brake torque                                             | Bremsemoment                                                         | Couple du frein                                                       |
| $M_N$                        | [Nm]                 | Coppia nominale                                                     | Rated torque                                             | Nennmoment                                                           | Couple nominal                                                        |
| $M_L$                        | [Nm]                 | Coppia resistente media                                             | Counter-torque during acceleration                       | Lastmoment                                                           | Couple résistant moyen                                                |
| $M_S$                        | [Nm]                 | Coppia di spunto                                                    | Starting torque                                          | Startmoment                                                          | Couple de démarrage                                                   |
| $n$                          | [min <sup>-1</sup> ] | Velocità nominale                                                   | Rated speed                                              | Nendrehzahl                                                          | Vitesse nominale                                                      |
| $P_B$                        | [W]                  | Potenza assorbita dal freno a 20°C                                  | Power drawn by the brake at 20°C                         | Leistungsaufnahme der Bremse bei 20°C                                | Puissance absorbée par le frein à 20°C                                |
| $P_n$                        | [kW]                 | Potenza nominale                                                    | Motor rated power                                        | Nennleistung                                                         | Puissance nominale                                                    |
| $P_r$                        | [kW]                 | Potenza richiesta                                                   | Required power                                           | Benötigte Leistung                                                   | Puissance nécessaire                                                  |
| $t_1$                        | [ms]                 | Ritardo di sblocco del freno con alimentatore a semionda            | Brake response time with one-way rectifier               | Ansprechzeit Bremse mit Einweg-Gleichrichter                         | Temps de déblocage du frein avec alimentation à demi-onde             |
| $t_{1s}$                     | [ms]                 | Tempo di sblocco del freno con alimentatore a controllo elettronico | Brake response time with electronic-controlled rectifier | Ansprechzeit Bremse mit elektronisch gesteuertem Gleichrichter       | Temps de déblocage du frein avec alimentation à contrôle électronique |
| $t_2$                        | [ms]                 | Ritardo di frenatura con disgiunzione lato c.a.                     | Brake reaction time with a.c. disconnect                 | Einfallszeit Bremse bei Unterbrechung der Stromversorgung WS         | Retard de freinage avec coupure coté c.a.                             |
| $t_{2c}$                     | [ms]                 | Ritardo di frenatura con disgiunzione circuito c.a. e c.c.          | Brake reaction time with a.c. and d.c. disconnect        | Einfallszeit Bremse bei Unterbrechung der Stromversorgung WS und GS  | Retard de freinage avec coupure coté c.a. et c.c.                     |
| $t_a$                        | [°C]                 | Temperatura ambiente                                                | Ambient temperature                                      | Umgebungstemperatur                                                  | Température ambiante                                                  |
| $t_f$                        | [min]                | Tempo di funzionamento a carico costante                            | Work time at constant load                               | Betriebsdauer unter Nennbelastung                                    | Temps de fonctionnement à charge constante                            |
| $t_r$                        | [min]                | Tempo di riposo                                                     | Rest time                                                | Aussetzzeit                                                          | Temps de repos                                                        |
| $W$                          | [J]                  | Lavoro di frenatura accumulato tra due regolazioni del traferro     | Braking work between service                             | Bremsenergie zwischen zwei Einstellungen                             | Energie de freinage accumulée entre deux réglages de l'entrefer       |
| $W_{max}$                    | [J]                  | Energia massima per singola frenatura                               | Maximum brake work for each braking                      | Max. Bremsarbeit pro Bremsvorgang                                    | Energie maxi par freinage                                             |
| $Z$                          | [1/h]                | N° di avviamenti ammissibili, a carico                              | Permissible starting frequency, loaded                   | Schalzhäufigkeit Nennbetrieb                                         | Nombre de démarrages admissibles en charge                            |
| $Z_0$                        | [1/h]                | N° di avviamenti ammissibili a vuoto (I = 50%)                      | Max. permissible no-load starting frequency (I = 50%)    | Max. Schalthäufigkeit im Leerlauf (relative Einschalt-dauer I = 50%) | Nombre de démarrages admissible à vide (I = 50%)                      |



## M1 - PROGRAMMA DI PRODUZIONE

Questo catalogo descrive i motori asincroni trifase in bassa tensione di produzione BONFIGLIOLI RIDUTTORI.

I motori sono del tipo chiuso con ventilazione esterna e rotore a gabbia per l'utilizzo in ambienti industriali.

## M1 - PRODUCTION PLANNING

*This catalogue discusses low-voltage three-phase asynchronous motors manufactured by BONFIGLIOLI RIDUTTORI.*

*Motors are the enclosed type with outer fan and cage-type rotor for use in industrial environments.*

## M1 - PRODUKTIONSPROGRAMM

In diesem Katalog werden die unter Niederspannung arbeitenden asynchronen Drehstrommotoren der Produktion von BONFIGLIOLI RIDUTTORI näher beschrieben. Hierbei handelt es sich um geschlossene Motoren mit Eigenbelüftung und einem Käfigrotor für den industriellen Einsatz.

## M1 - PROGRAMME DE PRODUCTION

*Ce catalogue décrit les moteurs asynchrones triphasés en basse tension produits par BONFIGLIOLI RIDUTTORI.*

*Les moteurs sont du type fermé avec ventilation extérieure et rotor à cage pour l'utilisation dans des milieux industriels.*

## M2 - NORMATIVE

I motori sono costruiti in accordo alle Norme CEI/EN ed IEC applicabili, riportate in tabella.

## M2 - REFERENCE STANDARDS

*Motors are manufactured in accordance with applicable CEI /EN and IEC standards, listed in the table.*

## M2 - NORMEN

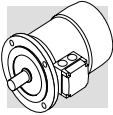
Die Motoren wurden in entsprechend der Normen CEI /EN und IEC, die in der nachstehenden Tabelle angegeben sind, gefertigt:

## M2 - NORMES

*Les moteurs sont fabriqués dans le respect des Normes CEI /EN et IEC applicables indiquées dans le tableau.*

(01)

| Titolo / Title / Titel / Titre                                                                                                                                                                                                                                                                                                                 | CEI             | IEC          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------|
| Prescrizioni generali per macchine elettriche rotanti<br><i>General requirements for rotating electrical machines</i><br>Allgemeine Vorschriften für umlaufende elektrische Maschinen<br><i>Prescriptions générales pour machines électriques tournantes</i>                                                                                   | CEI EN 60034-1  | IEC 60034-1  |
| Marcatore dei terminali e senso di rotazione per macchine elettriche rotanti<br><i>Terminal markings and direction of rotation of rotating machines</i><br>Kennzeichnung der Anschlußklemmen und Drehrichtung von umlaufenden elektrischen Maschinen<br><i>Définitions des bornes et sens de rotation pour machines électriques tournantes</i> | CEI 2-8         | IEC 60034-8  |
| Metodi di raffreddamento delle macchine elettriche<br><i>Methods of cooling for electrical machines</i><br>Verfahren zur Kühlung von elektrischen Maschinen<br><i>Méthodes de refroidissement des machines électriques</i>                                                                                                                     | CEI EN 60034-6  | IEC 60034-6  |
| Dimensioni e potenze nominali per macchine elettriche rotanti<br><i>Dimensions and output ratings for rotating electrical machines</i><br>Auslegung der Nennleistung von umlaufenden elektrischen Maschinen<br><i>Dimensions, puissances nominales pour machines électriques tournantes</i>                                                    | EN 50347        | IEC 60072    |
| Classificazione dei gradi di protezione delle macchine elettriche rotanti<br><i>Classification of degree of protection provided by enclosures for rotating machines</i><br>Klassifizierung der Schutzart von umlaufenden elektrischen Maschinen<br><i>Classification des degrés de protection des machines électriques tournantes</i>          | CEI EN 60034-5  | IEC 60034-5  |
| Limiti di rumorosità<br><i>Noise limits</i><br>Geräuschgrenzwerte<br><i>Limites de bruit</i>                                                                                                                                                                                                                                                   | CEI EN 60034-9  | IEC 60034-9  |
| Segni di designazione delle forme costruttive e dei tipi di installazione<br><i>Classification of type of construction and mounting arrangements</i><br>Abkürzungen zur Kennzeichnung der Bauform und der Einbaulagen<br><i>Sigles de dénomination des formes de construction et des types d'installation</i>                                  | CEI EN 60034-7  | IEC 60034-7  |
| Tensione nominale per i sistemi di distribuzione pubblica dell'energia elettrica a bassa tensione<br><i>Rated voltage for low voltage mains power</i><br>Nennspannung für öffentliche NS-Stromverteilungssysteme<br><i>Tension nominale pour les systèmes de distribution publique de l'énergie électrique en basse tension</i>                | CEI 8-6         | IEC 60038    |
| Grado di vibrazione delle macchine elettriche<br><i>Vibration level of electric machines</i><br>Schwingstärke bei elektrischen Maschinen<br><i>Degré de vibration des machines électriques</i>                                                                                                                                                 | CEI EN 60034-14 | IEC 60034-14 |



I motori corrispondono inoltre alle Norme straniere elencate qui di seguito:

*Motors are also in compliance with the national Standards listed below:*

Die Motoren entsprechen darüber hinaus den nachstehend aufgelisteten ausländischen Normen:

*Les moteurs correspondent aussi aux Normes étrangères suivantes :*

(02)

|                          |               |                      |                |                        |
|--------------------------|---------------|----------------------|----------------|------------------------|
| <b>DIN VDE 0530</b>      | Germania      | <i>Germany</i>       | Deutschland    | <i>Allemagne</i>       |
| <b>BS5000 / BS4999</b>   | Gran Bretagna | <i>Great Britain</i> | Großbritannien | <i>Grande Bretagne</i> |
| <b>AS 1359</b>           | Australia     | <i>Australia</i>     | Australien     | <i>Australie</i>       |
| <b>NBNC 51-101</b>       | Belgio        | <i>Belgium</i>       | Belgien        | <i>Belgique</i>        |
| <b>NEK - IEC 60034-1</b> | Norvegia      | <i>Norway</i>        | Norwegen       | <i>Norvège</i>         |
| <b>NF C 51</b>           | Francia       | <i>France</i>        | Frankreich     | <i>France</i>          |
| <b>OEVE M 10</b>         | Austria       | <i>Austria</i>       | Österreich     | <i>Autriche</i>        |
| <b>SEV 3009</b>          | Svizzera      | <i>Switzerland</i>   | Schweiz        | <i>Suisse</i>          |
| <b>NEN 3173</b>          | Paesi Bassi   | <i>Netherlands</i>   | Niederlande    | <i>Pays Bas</i>        |
| <b>SS 426 01 01</b>      | Svezia        | <i>Sweden</i>        | Schweden       | <i>Suède</i>           |

#### **Direttive CEE 73/23 (LVD) e CEE 89/336 (EMC)**

I motori della serie BN sono conformi ai requisiti delle Direttive CEE 73/23 (Direttiva Bassa Tensione) e CEE 89/336 (Direttiva Compatibilità Elettromagnetica), e riportano in targa la marcatura CE. Per quanto riguarda la Direttiva EMC, la costruzione è in accordo alle Norme CEI EN 60034-1 sez. 12, EN 50081, EN 50082.

I motori con freno FD, se corredati dell'opportuno filtro capacitivo in ingresso al raddrizzatore (variante **CF**), rientrano nei limiti di emissione previsti dalla Norma EN 50081-1 "Compatibilità elettromagnetica - Norma Generica sull'emissione - Parte 1: Ambienti residenziali, commerciali e dell'industria leggera".

I motori soddisfano inoltre le prescrizioni della Norma CEI EN 60204-1 "Equipaggiamento elettrico delle macchine".

**È responsabilità del costruttore o dell'assemblatore dell'apparecchiatura che incorpora i motori come componenti garantire la sicurezza e la conformità alle direttive del prodotto finale.**

#### ***Directives 73/23/ EEC (LVD) and 89/336/ EEC (EMC)***

*BN motors meet the requirements of Directives 73/23/EEC (Low Voltage Directive) and 89/336/EEC (Electromagnetic Compatibility Directive) and their name plates bear the CE mark. As for the EMC Directive, construction is in accordance with standards CEI EN 60034-1 Sect. 12, EN 50081, EN 50082.*

*Motors with FD brakes, when fitted with the suitable capacitive filter at rectifier input (option CF), meet the emission limits required by Standard EN 50081-1 "Electromagnetic compatibility - Generic Emission Standard - Part 1: Residential, commercial and light industrial environment".*

*Motors also meet the requirements of standard CEI EN 60204-1 "Electrical equipment of machines".*

***The responsibility for final product safety and compliance with applicable directives rests with the manufacturer or the assembler who incorporate the motors as component parts.***

#### **Richtlinien EWG 73/23 (LVD) und EWG 89/336 (EMC)**

Die Motoren der Serie BN entsprechen den Anforderungen der Richtlinien EWG 73/23 (Richtlinie - Niederspannung) und CEE 89/336 (Richtlinie - elektromagnetische Kompatibilität) und sind mit dem CE-Zeichen ausgestattet. Im Hinblick auf die Richtlinie EMC entspricht die Konstruktion den Normen CEI EN 60034-1, Abschn. 12, EN 50081, EN 50082.

Die Motoren mit dem Bremsstyp FD fallen, falls mit dem entsprechenden kapazitiven Filter am Eingang des Gleichrichters ausgestattet (Option **CF**), unter die Emissionsgrenzwerte, die von der Norm EN 50081-1 "Elektromagnetische Kompatibilität - Allgemeine Norm für Emissionen - Teil 1: Wohngebiete, Handels- und Leichtindustriezonen" vorgesehen werden".

Die Motoren entsprechen darüber hinaus den von der Norm CEI EN 60204-1 "Elektrische Maschinenausstattung" gegebenen Vorschriften.

**Es liegt in der Verantwortung des Herstellers oder des Monteurs der Anlage, in der die Motoren als Komponenten montiert werden, die Sicherheit und die Übereinstimmung mit den Richtlinien des Endprodukts zu gewährleisten.**

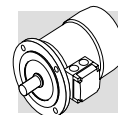
#### ***Directives CEE 73/23 (LVD) e CEE 89/336 (EMC)***

*Les moteurs de la série BN sont conformes aux conditions requises par les Directives CEE 73/23 (Directive Basse Tension) et CEE 89/336 (Directive Compatibilité Electromagnétique), et le marquage CE est indiqué sur la plaque signalétique. En ce qui concerne la Directive EMC, la fabrication répond aux Normes CEI EN 60034-1 Sect. 12, EN 50081, EN 50082.*

*Les moteurs avec frein FD, s'ils sont équipés du frein capacitif approprié en entrée du redresseur (option CF), rentrent dans les limites d'émission prévues par la Norme EN 50081-1 "Compatibilité électromagnétique - Norme Générique sur l'émission - Partie 1: Milieux résidentiels, commerciaux et de l'industrie légère".*

*Les moteurs répondent aussi aux prescriptions de la Norme CEI EN 60204-1 "Équipement électrique des machines".*

***Le fabricant ou le monteur de la machine qui comprend les moteurs comme composant est responsable et doit se charger de garantir la sécurité et la conformité aux directives du produit final.***



## Rendimento – Accordo CEMEP

Con l'obiettivo di ridurre significativamente il consumo europeo di energia elettrica mediante la sensibilizzazione degli utenti all'uso di motori maggiormente efficienti, la Commissione Europea per l'Energia e il CEMEP hanno concordato le condizioni ricorrenti per la classificazione dei motori elettrici in classi di rendimento denominate, in senso decrescente, **eff1**, **eff2** ed **eff3**.

Oggetto di questo accordo sono solamente i motori trifase standard in c.a. a 2 e 4 poli, costruzione chiusa con rotore a gabbia di scoiattolo, ventilazione esterna e potenza all'albero compresa fra 1,1 e 90 kW, alimentazione a 400V - 50 Hz in servizio continuo S1.

È facoltà dei costruttori di motori elettrici decidere di classificare volontariamente i propri prodotti in una delle tre classi di rendimento sopra citate. In questo caso essi devono apporre sulla targa il marchio relativo alla classe di rendimento applicabile ed inserire, fra i dati tecnici, i valori di rendimento a pieno carico ed a  $\frac{3}{4}$  del carico nominale. I motori Bonfiglioli ricompresi nell'oggetto di questo accordo sono conformi alla classe di rendimento **eff2** e sono pertanto chiaramente identificati in targa tramite il logo sotto riportato:

## Efficiency – the CEMEP agreement

CEMEP, the European Committee of Manufacturers of Electrical Machines and Power Electronics hopes to reduce electrical energy consumption in Europe by informing users of the efficiency of electrical motors. As a contribution in this direction, CEMEP has recently published an agreement stating the specifications for electric motor energy efficiency classes **eff1**, **eff2** and **eff3** (listed in order of decreasing efficiency).

The CEMEP agreement covers only standard, 2 and 4 pole, three phase, AC motors, of closed rotor and squirrel cage construction, with external ventilation and rated power at the output shaft of 1.1 to 90 kW, for use with a 400V - 50 Hz power supply under S1 continuous duty conditions.

It is left up to individual electric motor manufacturers to classify their products in one of the three above classes. If they decide to do so, they must apply the relevant efficiency mark to the motor and include, together with all the other relevant technical specifications, the measured efficiency figures for full rated load and  $\frac{3}{4}$  rated load.

Under the terms of this agreement, Bonfiglioli's electric motors conform to efficiency class **eff2** and are clearly identified as such by the following mark on the data plate:



## Wirkungsgrad - die CEMEP Vereinbarung

CEMEP, der europäische Herstellerverband von elektrischen Maschinen und Leistungs-Elektronik hofft, den elektrischen Energieverbrauch in Europa, durch Informationen über die Wirkungsgrade von elektrischen Motoren an die Benutzer, zu reduzieren.

Als Beitrag in dieser Richtung, hat die CEMEP vor kurzem eine Vereinbarung veröffentlicht, die die Energie-Effizienz-Klassen **eff1**, **eff2** und **eff3** für Elektromotoren spezifiziert. (Aufgelistet nach abnehmendem Wirkungsgrad).

Die CEMEP Vereinbarung beinhaltet nur 2 und 4 polige Drehstrommotoren mit geschlossenem Rotor als Kurzschlussläufer, integriertem Lüfter, Nennleistungen an der Abtriebswelle von 1.1 - 90 kW, mit einer Energieversorgung von 400V - 50Hz und der Betriebsart S1 (Dauerbetrieb).

Es bleibt den einzelnen Elektromotoren Herstellern überlassen, ihre Produkte nach einer der drei oben benannten Effizienz-Klassen zu klassifizieren. Wenn sie sich dazu entscheiden, müssen sie die relevante Markierung auf dem Motor anbringen und zusammen mit all den anderen relevanten technischen Einzelheiten, die gemessenen Wirkungsgradangaben bei Voll- und Dreiviertellast ausweisen.

Unter den Bedingungen dieser Vereinbarung entsprechen die elektrischen Motoren von Bonfiglioli der Effizienz-Klasse **eff2** und werden als solche durch die folgende Markierung auf dem Typenschild deutlich gekennzeichnet:

## Rendement – L'accord CEMEP

La Commission Européenne sur l'Energie et le CEMEP (European Committee of Manufacturers of Electrical Machines and Power Electronics), espère réduire de façon sensible la consommation européenne d'énergie électrique à travers l'information sur l'efficience des moteurs électriques. Pour ce faire, ils ont fixé une classification des moteurs électriques en « classes de rendement » appelée, en sens décroissant d'efficience : **eff1**, **eff2** et **eff3**.

Font partie de cet accord seulement les moteurs triphasés standard en c.a. à 2 et 4 pôles, de type fermé et rotor à cage, ventilation extérieure et puissance à l'arbre comprise entre 1,1 et 90 KW, alimentation à 400V- 50 Hz en service continue S1.

C'est au choix de chaque constructeur de moteurs électriques de décider de classer ces produits dans une des trois classes de rendement ci-dessus. Dans ce cas, le constructeur doit faire apparaître le logo de la classe de rendement sur la plaque marque et introduire, dans les caractéristiques techniques, les valeurs de rendement à pleine charge et à  $\frac{3}{4}$  de la charge nominale.

Le moteurs Bonfiglioli concernées dans cet accord, sont conformes à la classe de rendement **eff2** et de conséquence ils présentent, sur la plaque marque, le logo suivant :

## M3 - TOLLERANZE

Secondo le Norme CEI EN 60034-1 sono ammesse le tolleranze qui indicate per le grandezze garantite:

## M3 - TOLERANCES

Allowed tolerances for guaranteed parameters in accordance with standards CEI EN 60034-1 are indicated in the table below:

## M3 - TOLERANZEN

Den Normen CEI EN 60034-1 entsprechend sind für die angegebenen Werte folgende Toleranzen zulässig:

## M3 - TOLERANCES

Selon les Normes CEI EN 60034-1 les tolérances indiquées ci-dessous sont admises pour les tailles garanties :

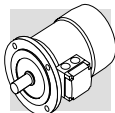
| -0.15 (1 - $\eta$ ) $P \leq 50$ kW      | Rendimento                 | Efficiency           | Wirkungsgrad                      | Rendement              |
|-----------------------------------------|----------------------------|----------------------|-----------------------------------|------------------------|
| $-(1 - \cos\phi) / 6$ min 0.02 max 0.07 | Fattore di potenza         | Power factor         | Leistungsfaktor                   | Facteur de puissance   |
| $\pm 20\%$ (*)                          | Scorrimento                | Slip                 | Schlupf                           | Glissement             |
| + 20%                                   | Corrente a rotore bloccato | Locked rotor current | Strom bei blockiertem Läufer      | Courant à rotor bloqué |
| -15% + 25%                              | Coppia a rotore bloccato   | Locked rotor torque  | Drehmoment bei blockiertem Läufer | Couple à rotor bloqué  |
| -10%                                    | Coppia max                 | Max. torque          | Max. Drehmoment                   | Couple max             |

(\*)  $\pm 30\%$  per motori con  $P_n < 1$  kW

(\*)  $\pm 30\%$  for motors with  $P_n < 1$  kW

(\*)  $\pm 30\%$  für Motoren mit  $P_n < 1$  kW

(\*)  $\pm 30\%$  pour moteurs avec  $P_n < 1$  kW



### M3.1 - TOLLERANZE GEOMETRICHE

L'estremità d'albero, la linguetta e la flangia hanno dimensioni e tolleranze secondo EN 50347, IEC 60072-1, CEI-UNEL 13501. Le estremità d'albero sono previste di foro filettato in testa secondo UNI 9321, DIN 332. I motori sono sempre forniti con linguetta inserita nella sede. La tabella seguente riporta le tolleranze previste per le diverse parti:

### M3.1 - GEOMETRIC TOLERANCES

*Dimensions and tolerances of shaft end, key and flange are in accordance with EN 50347, IEC 60072-1, CEI-UNEL 13501. Shaft ends feature an axial threaded hole in accordance with UNI 9321, DIN 332 and a key inserted in the suitable keyway. The following table reports the tolerances for the different parts:*

### M3.1 - GEOMETRISCHE TOLERANZEN

Die Wellenenden, der Federkeil und der Flansch entsprechen im Hinblick auf ihre Maße und Toleranzen den Normen EN 50347, IEC 60072-1 und CEI-UNEL 13501. Die Wellenenden sind an ihrer Stirnseite mit einer Gewindebohrung gemäß UNI 9321, DIN 332 versehen und werden mit einem in seinen Sitz eingefügten Federkeil geliefert. In der nachstehenden Tabelle werden für die verschiedenen Teile die entsprechenden Toleranzen angegeben:

### M3.1 - TOLERANCES GEOMETRIQUES

*L'extrémité de l'arbre, la clavette et la bride présentent des dimensions et tolérances selon EN 50347, IEC 60072-1, CEI-UNEL 13501. Les extrémités d'arbre sont dotées d'orifice fileté en tête, selon UNI 9321, DIN 332 ainsi que la clavette introduite dans le logement. Le tableau suivant indique les tolérances prévues pour les différentes pièces :*

(03)

| Componente / Component<br>Komponente / Composant             | Dimensioni / Dimensions<br>Abmessungen / Dimensions |           | Tolleranza /<br>Tolerance<br>Tolérance / Tolérance |
|--------------------------------------------------------------|-----------------------------------------------------|-----------|----------------------------------------------------|
| Estremità albero / Shaft end<br>Wellenende / Extrémité arbre | <b>D - DA</b>                                       | Ø 11 - 28 | <b>j6</b>                                          |
|                                                              |                                                     | Ø 38 - 48 | <b>k6</b>                                          |
|                                                              |                                                     | Ø ≥ 55    | <b>m6</b>                                          |
| Linguetta / Key<br>Federkeil / Clavette                      | <b>F - FA</b>                                       |           | <b>h9</b>                                          |
| Flangia / Flange<br>Flansch / Bride                          | <b>N</b>                                            | Ø < 250   | <b>j6</b>                                          |
|                                                              |                                                     | Ø ≥ 250   | <b>h6</b>                                          |

### M3.2 - RUMOROSITÀ

I valori di rumorosità, rilevati secondo il metodo indicato dalle Norme ISO 1680, sono contenuti entro i livelli massimi previsti dalle Norme CEI EN 60034-9.

### M3.2 - NOISE LEVEL

*Noise levels measured using the method specified by standard ISO 1680 are within the maximum limits required by standards CEI EN 60034-9.*

### M3.2 - GERÄUSCHPEGEL

Der Geräuschpegel wurde entsprechend der in der Norm ISO 1680 angegebenen Methode gemessen und liegt innerhalb der max. Werte, die von der Norm CEI EN 60034-9 vorgeschrieben werden.

### M3.2 - NIVEAU DE BRUIT

*Les valeurs du niveau de bruit, mesurées selon la méthode indiquée par les Normes ISO 1680 sont contenues dans les limites maximums prévues par les Normes CEI EN 60034-9.*

### M4 - SENSO DI ROTAZIONE

È possibile il funzionamento dei motori in entrambi i versi di rotazione. Con collegamento dei morsetti U1, V1, W1 alle fasi di linea L1, L2, L3 si ottiene la rotazione oraria, osservando l'albero dal lato accoppiamento. La marcia antioraria si ottiene scambiando fra loro due fasi.

### M4 - DIRECTION OF ROTATION

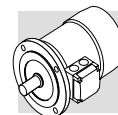
*Motors may operate in both directions of rotation. When the terminals U1, V1, W1 are connected to the line phases L1, L2, L3, the motor will run in a clockwise direction as viewed from the coupling end. Counter clockwise rotation is obtained by swapping two phases.*

### M4 - DREHRICHTUNG

Die Motoren können in beiden Drehrichtungen betrieben werden. Schließt man die Klemmen U1, V1, W1 an die Phasen L1, L2, L3 an, dreht sich der Motor, mit Sicht auf die Motorwelle betrachtet, im Uhrzeigersinn. Eine Drehrichtungsumkehr erhält man durch das Wechseln von zwei Phasen.

### M4 - SENS DE ROTATION

*Le fonctionnement des moteurs dans les deux sens de rotation est possible. Avec raccordement des bornes U1, V1, W1 aux phases de ligne L1, L2, L3 on obtient la rotation dans le sens des aiguilles d'une montre, en observant l'arbre côté accouplement. Invertir deux des phases pour obtenir la rotation dans le sens inverse des aiguilles d'une montre.*



## M5 - CUSCINETTI

I cuscinetti previsti sono del tipo radiale a sfere, precaricati assialmente, e dotati di carica di grasso per lubrificazione permanente.

La durata nominale a fatica  $L_{10h}$  in assenza di carichi esterni applicati all'albero e montaggio orizzontale è superiore a 40.000 ore. I tipi utilizzati sono indicati nella tabella seguente:

## M5 - BEARINGS

*Axially pre-loaded radial ball bearings, lubricated for life with the grease.*

*Nominal fatigue life  $L_{10h} \sim 40,000$  hours assuming no overhung load on the shaft, and mounting position horizontal.*

*The types of bearings in use are listed in the table below:*

## M5 - LAGER

Bei den verwendeten Lagern handelt es sich um axial vorge-spannte Radialkugellager mit einer für die Dauerschmierung ausgelegten Fettfüllung.

Der Nennwert der Ermüdungsdauer  $L_{10h}$  ohne auf die Welle einwirkenden Kräften und bei horizontaler Montage liegt bei über 40.000 Stunden:

## M5 - ROULEMENTS

*Les roulements prévus sont du type radial à billes, préchargés du point de vue axial et remplis de graisse pour une lubrification permanente.*

*La durée nominale à la fatigue  $L_{10h}$ , en l'absence de charges externes appliquées à l'arbre et avec un montage horizontal, est supérieure à 40.000 heures :*

(04)

|  | DE                                                             | NDE          |             |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------|--------------|-------------|
|                                                                                   | Tutti i motori / All motors<br>Alle Motoren / Tous les moteurs | BN_FD; BN_FA |             |
| <b>BN 56</b>                                                                      | 6201 2Z C3                                                     | 6201 2Z C3   | —           |
| <b>BN 63</b>                                                                      | 6201 2Z C3                                                     | 6201 2Z C3   | 6201 2RS C3 |
| <b>BN 71</b>                                                                      | 6202 2Z C3                                                     | 6202 2Z C3   | 6202 2RS C3 |
| <b>BN 80</b>                                                                      | 6204 2Z C3                                                     | 6204 2Z C3   | 6204 2RS C3 |
| <b>BN 90</b>                                                                      | 6205 2Z C3                                                     | 6205 2Z C3   | 6205 2RS C3 |
| <b>BN 100</b>                                                                     | 6206 2Z C3                                                     | 6206 2Z C3   | 6206 2RS C3 |
| <b>BN 112</b>                                                                     | 6306 2Z C3                                                     | 6306 2Z C3   | 6306 2RS C3 |
| <b>BN 132</b>                                                                     | 6308 2Z C3                                                     | 6308 2Z C3   | 6308 2RS C3 |
| <b>BN 160MR</b>                                                                   | 6309 2Z C3                                                     | 6308 2Z C3   | 6308 2RS C3 |
| <b>BN 160M/L</b>                                                                  | 6309 2Z C3                                                     | 6309 2Z C3   | 6309 2RS C3 |
| <b>BN 180M</b>                                                                    | 6310 2Z C3                                                     | 6309 2Z C3   | 6309 2RS C3 |
| <b>BN 180L</b>                                                                    | 6310 2Z C3                                                     | 6310 2Z C3   | 6310 2RS C3 |
| <b>BN 200L</b>                                                                    | 6312 2Z C3                                                     | 6310 2Z C3   | 6310 2RS C3 |

**DE** = lato comando

**NDE** = lato opposto comando

**DE** = drive end

**NDE** = non drive end

**DE** = Wellenseite

**NDE** = Lüfterseite

**DE** = sortie arbre

**NDE** = côté ventilateur

## M6 - OPERATIVITÀ STANDARD

### M6.1 - TENSIONE

I motori a singola polarità sono previsti, nell'esecuzione standard, per tensione nominale 230/400V  $\Delta/Y$  (o 400/690 V  $\Delta/Y$  per le grandezze da BN160 e BN 200) 50 Hz con tolleranza  $\pm 10\%$  (Eurotensione).

## M6 - STANDARD OPERATION

### M6.1 - VOLTAGE

*Standard single-speed motors are designed to operate from a rated voltage 230/400V  $\Delta/Y$  (or 400/690V  $\Delta/Y$  for frame sizes BN 160 through BN 200) 50 Hz, with  $\pm 10\%$  tolerance (Euro-voltage).*

## M6 - STANDARDVERSORGUNG

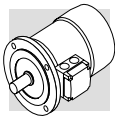
### M6.1 - SPANNUNG

Die einpoligen Motoren sind in der Standardausführung für eine Nennspannung von 230/400V  $\Delta/Y$  (oder 400/690V  $\Delta/Y$  für die Bau-größen von BN 160 bis BN 200) 50 Hz, mit einer Toleranz  $\pm 10\%$  (Euro-Spannung) ausgelegt. Die-

## M6 - CONDITIONS OPERATIVES

### M6.1 - TENSION

*Les moteurs à simple polarité sont prévus, dans l'exécution standard, pour une tension nominale de 230/400V  $\Delta/Y$  (ou 400/690V  $\Delta/Y$  pour les tailles de BN 160 à BN 200) 50 Hz, avec une tolérance de  $\pm 10\%$  (Euroten-*



I motori sono idonei per funzionamento sulla rete di distribuzione europea con tensione in accordo alla pubblicazione IEC 60038.

In targa sono indicati oltre alla tensione nominale, i campi di funzionamento consentiti, p.e. 220-240V  $\Delta$  /380-415V Y, 50 Hz. In accordo alla Norma CEI EN 60034-1, i motori possono funzionare alle tensioni sopra indicate con tolleranza del  $\pm 5\%$  (Zona A).

Per funzionamento ai limiti della tolleranza la temperatura può superare di 10 K il limite previsto dalla classe di isolamento adottata.

*Motors are suitable for operation with European power mains with voltage in accordance with publication IEC 60038.*

*Besides rated voltage, the name plate reports allowed operating ranges, e.g. 220-240V  $\Delta$  /380-415V Y, 50Hz. In accordance with standard CEI EN 60034-1, motors may operate at the above mentioned voltages with  $\pm 5\%$  tolerance (Zone A).*

*In operation at tolerance limits, temperature may exceed the temperature limit required by the adopted insulation class by 10 K.*

se Motoren eignen sich für einen Betrieb im Europäischen Versorgungsnetz mit einer Spannung, die den in der Veröffentlichung IEC 60038 angegebenen Werten entspricht. Auf dem Typenschild werden über die Nennspannung hinaus, auch die zulässigen Toleranzbereiche angegeben, z.B. 220-240V  $\Delta$ /380-415V Y, 50 Hz. In Übereinstimmung mit der Norm CEI EN 60034-1 können die Motoren unter den o.g. Spannungswerten mit einer Toleranz von  $\pm 5\%$  (Bereich A) arbeiten. Bei einem Betrieb an den Toleranzgrenzen kann die Temperatur die vorgesehene Isolationsklasse um 10 K überschreiten.

*sion). Les moteurs sont adaptés pour fonctionner sur le réseau de distribution européen avec une tension correspondant aux indications de la norme CEI 60038.*

*Sur la plaque signalétique sont indiquées, outre la tension nominale, les plages de fonctionnement autorisées, par ex. 220-240V  $\Delta$ /380-415V Y, 50 Hz. En accord avec la norme CEI EN 60034-1, les moteurs peuvent fonctionner aux tensions susmentionnées avec une tolérance de  $\pm 5\%$  (Zone A). Pour un fonctionnement aux limites de la tolérance, la température peut dépasser de 10 K la limite prévue pour la classe d'isolation adoptée.*

(05)

|  | $V_{\text{mot}} \pm 10\%$<br>3 ~                          | Esecuzione<br>Configuration<br>Ausführung<br>Execution                                                                                       |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BN 56 ... BN 132</b>                                                           | 230/400 V $\Delta$ /Y<br>460 V Y<br>50 Hz<br>60 Hz        | Standard                                                                                                                                     |
| <b>BN 160 ... BN 200</b>                                                          | 400/690 V $\Delta$ /Y<br>460 V $\Delta$<br>50 Hz<br>60 Hz | Standard                                                                                                                                     |
| <b>BN 100 ... BN 132</b>                                                          | 400/690 V $\Delta$ /Y<br>460 V $\Delta$<br>50 Hz<br>60 Hz | A richiesta, senza sovrapprezzo<br>At request, carries no extra charge<br>Auf Anfrage, ohne Aufpreis<br>Sur demande, sans majoration de prix |

I motori a doppia polarità sono previsti per alimentazione standard 400V / 50 Hz; tolleranze applicabili secondo CEI EN 60034-1.

Nella tabella (06) sono indicati i collegamenti previsti in funzione della polarità:

*Switch-pole motors are designed to operate from 400V - 50 Hz standard power supply. Applicable tolerances are in accordance with standard CEI EN 60034-1. The table (06) reports the required connections depending on the number of poles:*

Die polumschaltbaren Motoren sind für eine Standardversorgung von 400V – 50 Hz ausgelegt; Toleranzen gelten gemäß CEI EN 60034-1. In der Tabelle (06) werden in Abhängigkeit von den jeweiligen Polzahlen die Wicklungsanschlüsse angegeben:

*Les moteurs à double polarité sont prévus pour une alimentation standard 400V – 50 Hz ; tolérances applicables selon la norme CEI EN 60034-1. Les branchements prévus en fonction de la polarité sont indiqués sur le tableau (06) :*

(06)

|  | Poli<br>Number of poles<br>Polzahl<br>Nombre de poles | Collegamento avvolgimento<br>Winding connection<br>Wicklungsanschluß<br>Connexion du bobinage |
|-------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>BN 63 ... BN 200</b>                                                             | 2,4,6,8                                               | $\Delta$ /Y                                                                                   |
|                                                                                     | 2/4, 4/8                                              | $\Delta$ / YY (Dahlander)                                                                     |
|                                                                                     | 2/6, 2/8, 2/12, 4/6                                   | Y / Y (due avvolgimenti<br>Two windings<br>Zwei wicklungen<br>Deux bobinage)                  |

## M6.2 - FREQUENZA

I motori della serie BN sono previsti per essere normalmente utilizzati su reti a 50 Hz o 60 Hz.

## M6.2 - FREQUENCY

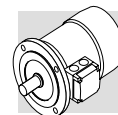
*The motors of the BN series may operate under 50 or 60 Hz supply.*

## M6.2 - FREQUENZ

Die Motoren der Serie BN können mit 50 Hz oder 60 Hz betrieben werden.

## M6.2 - FREQUENCE

*Les moteurs de la série BN peuvent être normalement utilisés sur des réseaux en 50 Hz ou 60 Hz.*



### M6.3 - TEMPERATURA AMBIENTE

Le tabelle dati tecnici del catalogo riportano le caratteristiche funzionali a 50Hz, per le condizioni di installazione previste dalle Norme CEI EN 60034-1 (temperatura compresa tra -15 °C e +40 °C ed altitudine ≤ 1000 m s.l.m.).  
I motori possono essere impiegati con temperature comprese tra 40 °C e 60 °C applicando i declassamenti di potenza indicati nella tabella (07):

### M6.3 - AMBIENT TEMPERATURE

*Catalog rating charts report operating characteristics at 50 Hz, under installation conditions as specified by standards CEI EN 60034-1 (temperature between -15 °C and + 40 °C and altitude above sea level ≤ 1000 m). Motors may be used at ambient temperatures between 40°C and 60°C as long as the derating factors listed in the table (07) are applied:*

### M6.3 - UMGEBUNGSTEMPERATUR

Die im Katalog enthaltenen Tabellen geben die Betriebsdaten bei 50 Hz für die Einbaubedingungen gemäß den Normen CEI EN 60034-1 (Temperatur zwischen -15 °C und + 40 °C und Höhe ≤ 1000 m ü. M.) an. Die Motoren können auch bei Temperaturen zwischen 40°C und 60°C eingesetzt werden, in diesem Fall müssen jedoch die in der Tabelle (07) angegebenen Leistungsreduzierungen beachtet werden:

### M6.3 - TEMPERATURE AMBIANTE

*Les tableaux des caractéristiques techniques du catalogue indiquent les caractéristiques de fonctionnement à 50 Hz, pour les conditions d'installation prévues par les normes CEI EN 60034-1 (température comprise entre -15 °C et + 40 °C à une altitude de ≤ 1000 m ). Les moteurs peuvent être utilisés à des températures comprises entre 40°C et 60°C en appliquant les déclassements de puissance indiqués dans le tableau (07) :*

|      |                                                                                                                                                                                            |      |      |     |     |     |     |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|-----|-----|-----|-----|
| (07) | Temperatura ambiente / Ambient temperature<br>Umgebungstemperatur / Température ambiante                                                                                                   | [°C] | 40°  | 45° | 50° | 55° | 60° |
|      | Potenza ammissibile in % della potenza nominale<br>Permitted power as a % of rated power<br>Zulässige Leistung in % der Nennleistung<br>Puissance admissible en % de la puissance nominale |      | 100% | 95% | 90% | 85% | 80% |

Quando è richiesto un declassamento del motore superiore al 15%, contattare il ns. Servizio Tecnico.

*When the applicable derating factor for the motor exceeds 15%, please contact our Technical Service Dept.*

Ist eine Rückstufung des Motors von mehr als 15% erforderlich, setzen sie sich bitte mit unserem Technischen Kundendienst in Verbindung.

*En cas de nécessité d'un déclassement du moteur supérieur à 15%, contacter notre Service Technique.*

### M7 - FUNZIONAMENTO A 60 Hz

I motori della serie BN possono essere normalmente utilizzati anche su reti a 60 Hz.  
Ad esclusione dei motori autofrenanti in c.c., tipo BN\_FD, nella targa dei motori, oltre alle tensioni a 50 Hz, sono riportati i valori corrispondenti al funzionamento a 460 V - 60Hz, ed il relativo campo di tensione 440-480V.

### M7 - 60 Hz OPERATION

*BN motors may also operate with 60 Hz power mains. Except for DC brake motors type BN\_FD, motor name plate reports 50 Hz voltage ratings, as well as the values for operation at 460 V - 60Hz and the corresponding voltage range 440-480V.*

### M7 - BETRIEB BEI A 60 Hz

Die Motoren der Serie BN können normalerweise auch in Stromnetzen mit 60 Hz Frequenz eingesetzt werden.  
Mit Ausnahme der Bremsmotoren mit Gleichstromes vom Typ BN\_FD, werden auf dem Typenschild der Motoren über die Angabe der Spannungen bei 50 Hz auch die Werte angegeben, die einem Betrieb bei 460 V - 60Hz entsprechen. Darüber hinaus kann man diesem Schild den entsprechenden Spannungsbereich 440-480V entnehmen.

### M7 - FONCTIONNEMENT A 60 Hz

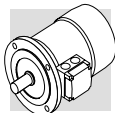
*Les moteurs de la série BN peuvent aussi être normalement utilisés sur des réseaux à 60 Hz. A l'exception des moteurs frein en c.c., type BN\_FD, sur la plaque signalétique des moteurs, outre la tension à 50 Hz, sont indiqués les valeurs correspondant au fonctionnement à 460 V - 60Hz ainsi que la plage de tension relative 440-480V.*

In corrispondenza dell'alimentazione 460V-60 Hz la targa del motore riporta valori di potenza aumentata di circa il 20% (non applicabile ai motori autofrenanti con freno in c.c., tipo BN\_FD).

*For 460V-60 Hz power supply, the power ratings reported in the motor name plate are about 20% higher (does not apply to DC brake motors type BN\_FD). Name plate rated power for op-*

Bei einer Spannungsversorgung mit 460V-60 Hz werden auf dem Typenschild etwa 20% höhere Leistungswerte angegeben (gilt nicht für die Bremsmotoren mit Gleichstrombremse

*En face de l'alimentation 460V-60 Hz la plaque signalétique du moteur indiquent les valeurs de puissance majorée d'environ 20% (non applicable aux moteurs frein avec frein en*



La potenza nominale di targa, a 60 Hz, è quella riportata nella tabella (08) seguente:

eration with 60 Hz power mains is as reported in the table below (08):

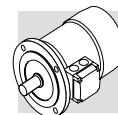
vom Typ BN\_FD). Der nachstehenden Tabelle (08) können Sie die auf dem Typenschild angegebene Nennleistung bei 60 Hz entnehmen:

c.c., type BN\_FD).

La puissance nominale indiquée sur la plaque, à 60 Hz, est celle figurant dans le tableau (08) suivant :

(08)

|  | Pn [kW] |      |      |      |
|-----------------------------------------------------------------------------------|---------|------|------|------|
|                                                                                   | 2p      | 4p   | 6p   | 8p   |
| <b>56A</b>                                                                        | —       | 0.07 | —    | —    |
| <b>56B</b>                                                                        | —       | 0.10 | —    | —    |
| <b>63A</b>                                                                        | 0.21    | 0.14 | 0.10 | —    |
| <b>63B</b>                                                                        | 0.30    | 0.21 | 0.14 | —    |
| <b>63C</b>                                                                        | 0.45    | 0.30 | —    | —    |
| <b>71A</b>                                                                        | 0.45    | 0.30 | 0.21 | 0.10 |
| <b>71B</b>                                                                        | 0.65    | 0.45 | 0.30 | 0.14 |
| <b>71C</b>                                                                        | 0.90    | 0.65 | 0.45 | —    |
| <b>80A</b>                                                                        | 0.90    | 0.65 | 0.45 | 0.21 |
| <b>80B</b>                                                                        | 1.30    | 0.90 | 0.65 | 0.30 |
| <b>80C</b>                                                                        | 1.80    | 1.3  | 0.90 | —    |
| <b>90S</b>                                                                        | —       | 1.3  | 0.90 | 0.45 |
| <b>90SA</b>                                                                       | 1.8     | —    | —    | —    |
| <b>90SB</b>                                                                       | 2.2     | —    | —    | —    |
| <b>90L</b>                                                                        | 2.5     | —    | 1.3  | 0.65 |
| <b>90LA</b>                                                                       | —       | 1.8  | —    | —    |
| <b>90LB</b>                                                                       | —       | 2.2  | —    | —    |
| <b>100L</b>                                                                       | 3.5     | —    | —    | —    |
| <b>100LA</b>                                                                      | —       | 2.5  | 1.8  | 0.85 |
| <b>100LB</b>                                                                      | 4.7     | 3.5  | 2.2  | 1.3  |
| <b>112M</b>                                                                       | 4.7     | 4.7  | 2.5  | 1.8  |
| <b>132S</b>                                                                       | —       | 6.5  | 3.5  | 2.5  |
| <b>132SA</b>                                                                      | 6.5     | —    | —    | —    |
| <b>132SB</b>                                                                      | 8.7     | —    | —    | —    |
| <b>132M</b>                                                                       | 11      | —    | —    | 3.5  |
| <b>132MA</b>                                                                      | —       | 8.7  | 4.6  | —    |
| <b>132MB</b>                                                                      | —       | 11   | 6.5  | —    |
| <b>160MR</b>                                                                      | 12.5    | 12.5 | —    | —    |
| <b>160MB</b>                                                                      | 17.5    | —    | —    | —    |
| <b>160M</b>                                                                       | —       | —    | 8.6  | —    |
| <b>160L</b>                                                                       | 21.5    | 17.5 | 12.6 | —    |
| <b>180M</b>                                                                       | 24.5    | 21.5 | —    | —    |
| <b>180L</b>                                                                       | —       | 25.3 | 17.5 | —    |
| <b>200L</b>                                                                       | 34      | 34   | 22   | —    |



Per i motori a doppia polarità con frequenza di alimentazione 60Hz l'incremento di potenza previsto, rispetto a quanto riportato nelle tabelle dati tecnici a 50 Hz, è circa del 15%.

I motori ad una velocità con avvolgimento standard, se utilizzati su reti a 60 Hz e tensioni come riportato in tabella (09), presentano variazioni delle grandezze principali come nel seguito descritto:

*For switch-pole motors operating with 60 Hz input frequency, the power increase factor over 50 Hz ratings is in the order of 15%.*

*Key parameter variations for single-pole motors with standard winding operating with 60 Hz power mains at the voltage ratings reported in the table (09) are reported below (variations expressed as percentages):*

Für die polumschaltbaren Motoren mit einer Spannungsversorgung von 60 Hz beträgt die Leistungserhöhung im Vergleich zu den Angaben in der Tabelle der sich auf 50 Hz beziehenden technischen Daten ungefähr 15%.

Für die einpoligen Motoren mit Standardwicklung die in Versorgungsnetzen mit 60 Hz und mit Spannungen gemäß Tabelle (09) eingesetzt werden, gelten die folgenden Werte:

*Pour les moteurs à double polarité avec fréquence d'alimentation 60 Hz l'augmentation de puissance prévue, par rapport aux indications des tableaux des caractéristiques techniques à 50 Hz, est d'environ 15%.*

*Les moteurs à une vitesse avec bobinage standard, lorsqu'ils sont utilisés sur des réseaux à 60 Hz et des tensions comme indiqué dans le tableau (09), présentent des variations des valeurs principales en pourcentage comme indiqué ci-dessous :*

(09)

| 50 Hz          | 60 Hz                      |      |           |                        |
|----------------|----------------------------|------|-----------|------------------------|
| V              | V                          | Pn   | Mn, Ma/Mn | n [min <sup>-1</sup> ] |
| 230/400 Δ /Y   | 220 - 240 Δ<br>380 - 415 Y | 1    | 0.83      | 1.2                    |
| 400/690 V Δ /Y | 380 - 415 Δ                |      |           |                        |
| 230/400 V Δ /Y | 265 - 280 Δ<br>440 - 480 Y | 1.15 | 1         | 1.2                    |
| 400/690 V Δ /Y | 440 - 480 Δ                |      |           |                        |
| 230/400 V Δ /Y | 265 - 280 Δ 440 - 480 Y    | 1.15 | 1         | 1.2                    |
| 400/690 V Δ /Y | 440 - 480 Δ                |      |           |                        |

I freni, se presenti, dovranno sempre essere alimentati come riportato in targa.

*Brakes, if fitted, must always be supplied as specified on the name plate.*

Die Bremsen, falls vorhanden, müssen immer wie gezeichnet auf dem Typenschild versorgt werden.

*Si présents, les freins doivent toujours être alimentés indiquée sur la plaque signalétique.*

## PN

L'opzione consente di avere sulla targa del motore il valore di potenza normalizzata a 50 Hz, anche quando è specificata l'alimentazione a 60 Hz.

*With this option, motor name plate includes 50 Hz normalized power information even when motor is designated for operation with 60 Hz power mains.*

Diese Option ermöglicht es auf dem Typenschild des Motors den Wert der auf 50 Hz genormten Leistung angeben zu können, auch wenn eine Spannungsversorgung bei 60 Hz erfolgt.

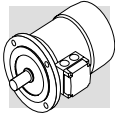
*L'option permet d'avoir sur la plaque signalétique du moteur la valeur de puissance normalisée à 50 Hz, même lorsque l'alimentation à 60 Hz est spécifiée.*

Per alimentazioni a 60 Hz con le tensioni 230/460V e 575V l'opzione PN viene applicata di default.

*For 60 Hz supplies along with voltages 230/460V and 575V the PN option is applied by default.*

Die Option PN ist immer dabei mit 60 Hz und Spannungsversorgung 230/460V und 575V 60 Hz.

*Pour alimentations à 60 Hz avec tensions 230/460V et 575V l'option PN est appliqué de default.*



## M7.1 - MOTORI PER USA E CANADA

## M7.1 - MOTORS FOR USA AND CANADA

## M7.1 - MOTOREN FÜR DIE USA UND KANADA

## M7.1 - MOTEURS POUR ETATS-UNIS ET CANADA

### CUS

I motori da BN 56 a BN 200 sono disponibili in esecuzione NEMA Design C (per le caratteristiche elettriche), certificata in conformità alle norme CSA (Canadian Standard) C22.2 N° 100 e UL (Underwriters Laboratory) UL 1004 con targhetta riportante il marchio:

*BN motor's sizes 56 through 200, are available in NEMA Design C configuration (concerning electrical characteristics), certified to CSA (Canadian Standard) C22.2 No. 100 and UL (Underwriters Laboratory) UL 1004. Through the option CUS the name plate is "cCSAus" marked:*

Die Motoren BN 56...BN 200 sind in der Ausführung NEMA, Design C (aufgrund der elektrischen Eigenschaften), den Normen CSA (Canadian Standard) C22.2 Nr. 100 und UL (Underwriters Laboratory) UL 1004 gemäß zertifiziert und mit einem Typenschild mit:

*Les moteurs BN 56...BN 200 sont disponibles en exécution NEMA Design C (pour les caractéristiques électriques), certifiée conforme aux normes CSA (Canadian Standard) C22.2 N° 100 et UL (Underwriters Laboratory) UL 1004 avec plaque signalétique indiquant la marque :*



(tensione  $\leq 600V$ ).

(voltage  $\leq 600V$ )

Zeichen (Spannung  $\leq 600V$ ) (tension  $\leq 600V$ ).  
versehen.

Le tensioni delle reti di distribuzione americane e le corrispondenti tensioni nominali da specificare per il motore sono indicate nella tabella seguente:

*US power mains voltages and the corresponding rated voltages to be specified for the motor are indicated in the following table:*

Die Spannungen der amerikanischen Verteilernetze und die entsprechenden Nennspannungen, die bei der Bestellung der Motore angegeben werden müssen, können der folgenden Tabelle entnommen werden:

*Les tensions des réseaux de distribution américains ainsi que les tensions nominales à spécifier pour le moteur sont indiquées dans le tableau suivant :*

(10)

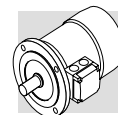
| Frequenza<br>Frequency<br>Frequenz<br>Fréquence | Tensione di rete<br>Mains voltage<br>Netzspannung<br>Tension de réseau | Tensione nominale motore<br>Motor rated voltage<br>Nennspannung des Motors<br>Tension nominale moteur |
|-------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 60 Hz                                           | 208 V                                                                  | <b>200 V</b>                                                                                          |
|                                                 | 240 V                                                                  | <b>230 V</b>                                                                                          |
|                                                 | 480 V                                                                  | <b>460 V</b>                                                                                          |
|                                                 | 600 V                                                                  | <b>575 V</b>                                                                                          |

I motori dotati di collegamento YY/Y (es. 230/460-60; 220/440-60) presentano di serie una morsettiera a 9 terminali. Per le stesse esecuzioni, e inoltre per l'alimentazione 575V-60Hz, la potenza di targa corrisponde a quella normalizzata a 50Hz. Per i motori autofrenanti con freno in c.c. tipo BN\_FD l'alimentazione del raddrizzatore è da morsettiera motore con tensione 230V a.c. monofase.

*Motors with YY/Y connection (e.g. 230/460-60; 220/440-60) feature, as standard, a 9-stud terminal board. For same executions, as well as for 575V-60Hz supply, the nominal rating is coincident with the correspondent 50Hz rating. For DC brake motors type BN\_FD, the rectifier is connected to a single-phase 230 VAC supply voltage in the motor terminal box.*

Motoren mit YY/Y-Anschluss (z.B. 230/460-60; 220/440-60) sind standardmäßig mit 9 Pins auf dem Klemmbrett ausgeführt. Für gleiche Ausführungen, ebenso wie für 575V-60Hz, die Nennleistung ist gleich mit der entsprechenden 50 Hz-Leistung. Für Bremsmotoren mit Gleichstrombremse vom Typ BN\_FD erfolgt die Versorgung des Gleichrichters über den Motorklemmenkasten mit einer

*Les moteurs avec connexion YY/Y (ex. 230/460-60; 220/440-60) présentent, en standard, une plaque à borne avec 9 bornes. Pour les mêmes exécutions, et aussi pour l'alimentation 575V-60Hz, la puissance de plaque correspond à celle normalisé à 50Hz. Pour les moteurs frein avec frein en c.c. type BN\_FD, l'alimentation du redresseur provient de la boîte à bornes moteur avec une tension 230V c.a. monophasée.*



Per i motori autofrenanti l'alimentazione del freno è così predisposta:

**Brake power supply for brake motors is as follows:**

Spannung von 230V (einphasiger Wechselstrom). Bei Bremsmotoren stellt sich die **Versorgung der Bremse** wie folgt dar:

**Pour les moteurs frein l'alimentation du frein est la suivante :**

|      |                                                                                                                            |  |                                                                                                                             |                                                                |
|------|----------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| (11) | <b>BN_FD</b>                                                                                                               |  | <b>BN_FA ; BN_BA</b>                                                                                                        | Specificare:<br>Power supply:<br>Bitte angeben:<br>Spécifier : |
|      | Da morsettiera motore<br><i>Connected to terminal box</i><br>Vom Motorklemmenkasten<br><i>Depuis boîte à bornes moteur</i> |  | Alimentazione separata<br><i>Separate power supply</i><br>Fremdversorgung<br><i>Alimentation séparée</i><br>230 V Δ - 60 Hz | <b>230SA</b>                                                   |
|      | 1~ 230 V a.c.                                                                                                              |  | Alimentazione separata<br><i>Separate power supply</i><br>Fremdversorgung<br><i>Alimentation séparée</i><br>460 V Y - 60 Hz | <b>460SA</b>                                                   |

L'opzione CUS non è applicabile ai motori dotati di servoventilazione.

*The option CUS does not apply to servo-ventilated motors.*

Die CUS-Option ist für die Fremdlüftermotoren nicht anwendbar

*L'option CUS n'est pas applicable aux moteurs doués de ventilation forcée.*

## M8 - ALIMENTAZIONE DA INVERTER

I motori elettrici della serie BN possono essere utilizzati con alimentazione da inverter PWM e tensione nominale all'ingresso del convertitore fino a 500 V.

Il sistema isolante adottato sui motori di serie prevede l'isolamento di fase con separatori, l'utilizzo di filo smaltato in grado 2 e resine d'impregnazione in classe H (limite di tenuta all'impulso di tensione 1600V picco-picco e fronte di salita  $t_s > 0.1 \mu s$  ai morsetti motore).

Le caratteristiche tipiche coppia/velocità in servizio S1 per motore con frequenza base  $f_b = 50$  Hz sono riportate nella tabella seguente.

Per frequenze di funzionamento inferiori a circa 30 Hz, a causa della diminuzione della ventilazione, i motori standard autoventilati (IC 411) devono essere opportunamente declassati in coppia o, in alternativa, devono essere provvisti di ventilatore con alimentazione separata (vedi par. M12).

Per frequenze maggiori alla frequenza base, raggiunto il valore massimo di tensione di uscita dell'inverter, il motore lavora in un campo di funzionamento a

## M8 - INVERTER CONTROL

*The BN type electric motors are suitable for PWM inverter control with rated voltage at transformer input up to 500 V.*

*The insulating system adopted on standard motors uses phase insulation with separators, grade 2 enamelled wire and impregnation resins in class H (maximum voltage pulse 1600 V peak-to-peak and rise edge  $t_s > 0.1 \mu s$  at motor terminals).*

*Typical torque/speed characteristics for S1 duty for motors operating with basic frequency  $f_b = 50$  Hz is are reported in the table below.*

*Operating at the frequencies below 30 Hz impair ventilation efficiency, standard motors with incorporated fan (IC 411) require either a corresponding torque reduction or, alternately, a fan with separate power supply. (See par M12)*

*For frequencies greater than basic frequency, once inverter maximum output voltage has been reached, the motor will be working in a steady power operation range, with shaft torque decreasing approximately with ratio  $(f/f_b)$ .*

*As motor maximum torque de-*

## M8 - FREQUENZUMRICHTER-BETRIEB

Die Elektromotoren der Serie BN können mit einem Frequenzumrichter und einer Nennspannung am Eingang des Umrichters bis zu 500 V versorgt werden.

Die Motoren haben eine Phasentrennung über Wicklungstrenner, Emaildraht der Klasse 2 mit Imprägnierharzen der Klasse H vor (Widerstandsgrenze gegen einen Spannungsimpuls von 1600 V und Anstiegsrampe  $t_s > 0.1 \mu s$  an den Motorklemmen).

Die typischen Merkmale Drehmoment/Drehzahl in der Betriebsart S1 für Motoren mit einer Eckfrequenz von  $f_b = 50$  Hz werden in der nachstehenden Tabelle angegeben. Bei Frequenzen von unter 30 Hz liegenden Betriebsfrequenzen müssen die eigenbelüfteten Standardmotoren (IC 411) aufgrund ihrer geringeren Kühlwirkung in ihrem Drehmoment zurückgestuft oder, alternativ, mit einem Fremdlüfter ausgestattet werden (siehe Par. M12).

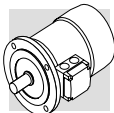
Wenn der Motor oberhalb der Eckfrequenz betrieben wird, arbeitet er im Feldschwächebereich. In diesem Bereich kon-

## M8 - ALIMENTATION PAR VARIATEUR

*Les moteurs électriques de la série BN peuvent être utilisés avec alimentation par variateur PWM, et tension nominale en entrée du convertisseur jusqu'à 500V. Le système isolant adopté sur les moteurs de série prévoit l'isolation de phase avec séparateurs, l'utilisation de fil émaillé niveau 2 et résines d'impregnation de classe H (limite de maintien à l'impulsion de tension 1600V pic-pic et front de montée  $t_s > 0.1 \mu s$  aux bornes moteur).*

*Les caractéristiques typiques couple/vitesse en service S1 pour moteur avec fréquence de base  $f_b = 50$  Hz sont indiquées dans le tableau suivant. Pour des fréquences de fonctionnement inférieures à environ 30 Hz, à cause de la diminution de la ventilation, les moteurs standards autoventilés (IC411) doivent être opportunément déclassés au niveau du couple ou, en alternative, doivent être équipés de ventilateur avec alimentation séparée (voir paragraphe M12).*

*Pour des fréquences supérieures à la fréquence de base, une fois la valeur maximale de tension de sortie du variateur atteinte, le moteur fonctionne dans une plage*



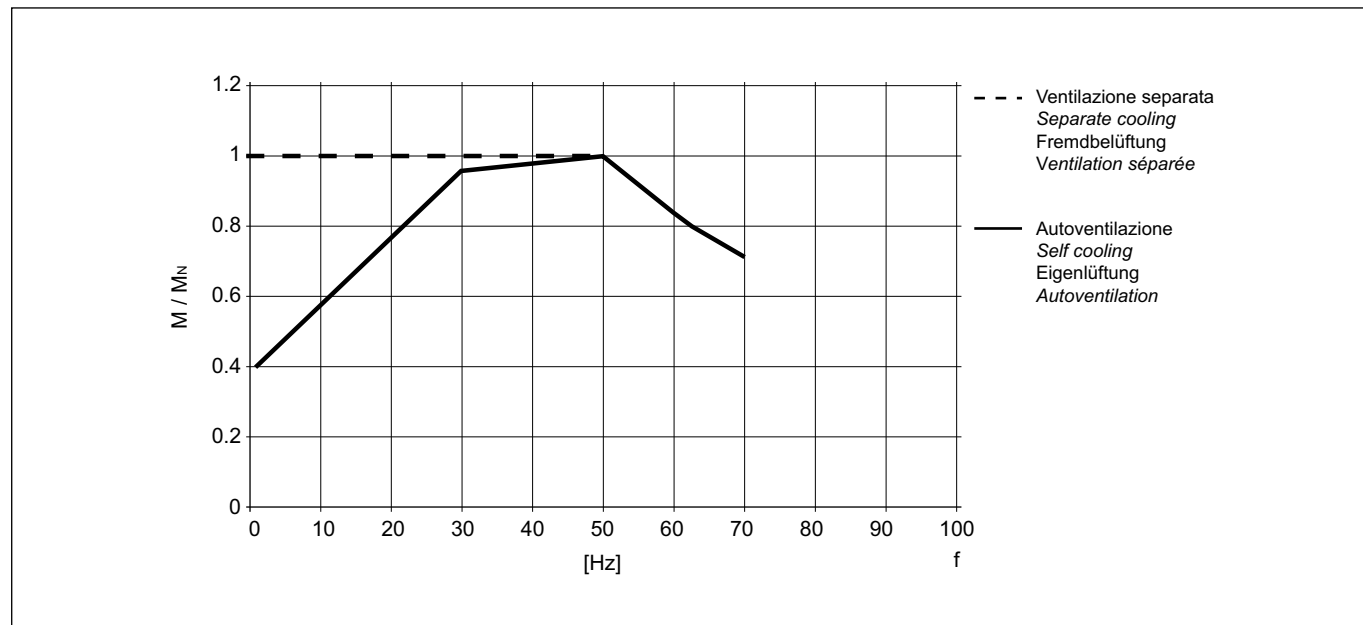
potenza costante, con coppia all'albero che si riduce ca. con il rapporto  $(f/f_b)$ . Poiché la coppia massima del motore decresce ca. con  $(f/f_b)^2$ , il margine di sovraccarico ammesso dovrà essere progressivamente ridotto.

*creases approximately with  $(f/f_b)^2$ , the permitted overload reserve will have to be reduced gradually.*

stanter Leistung fällt das Drehmoment des Motors ungefähr um das Verhältnis  $(f/f_b)$  ab. Da die maximale Motordrehzahl sich mit ungefähr  $(f/f_b)^2$  verringert, muss die zulässige Belastungsgrenze in progressiv reduziert werden.

*de fonctionnement à puissance constante, avec un couple à l'arbre qui se réduit approximativement dans le rapport  $(f/f_b)$ . Etant donné que le couple maximum du moteur diminue approximativement en relation avec  $(f/f_b)^2$ , la marge de surcharge admise devra être progressivement réduite.*

(12)



Per funzionamento oltre la frequenza nominale, la velocità limite meccanica dei motori è riportata nella tabella qui di seguito:

*The following table reports the mechanical speed limit for motors operating above rated frequency:*

Für Anwendungen, bei denen der Motor oberhalb der Eckfrequenz betrieben wird, finden sie die mechanische Drehzahlgrenzen in der folgenden Tabelle:

*En cas de fonctionnement au-delà de la fréquence nominale, la vitesse limite mécanique des moteurs est indiquée dans le tableau suivant :*

(13)

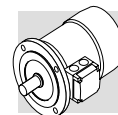
|  | n [min <sup>-1</sup> ] |      |       |
|-------------------------------------------------------------------------------------|------------------------|------|-------|
|                                                                                     | 2P                     | 4P   | 6P/8P |
| <b>BN 56...BN 100</b>                                                               | 5200                   | 4000 | 3000  |
| <b>BN 112</b>                                                                       | 5200                   | 4000 | 3000  |
| <b>BN 132...BN 160MR</b>                                                            | 4500                   | 4000 | 3000  |
| <b>BN 160M...BN 180M</b>                                                            | 4500                   | 4000 | 3000  |
| <b>BN 180L...BN 200L</b>                                                            | 4500                   | 3600 | 3000  |

A velocità superiori alla nominale i motori presentano maggiori vibrazioni meccaniche e rumorosità di ventilazione; è consigliabile, per queste applicazioni,

*Motors operating above rated speed show an increased tendency for mechanical vibration and fan noise. When this is the case, rotor balancing in grade R*

Bei Drehzahlen oberhalb der Nenndrehzahlen weisen die Motoren stärkere mechanische Schwingungen und Lüftungengeräusche auf: In diesen Fällen

*A des vitesses supérieures à la vitesse nominale, les moteurs présentent plus de vibrations mécaniques et de bruit de ventilation ; pour ces applications, il*



un bilanciamento del rotore in grado R - opzione **RV** - ed eventualmente il ventilatore con alimentazione separata - opzioni **U1** o **U2**.

Sia il servomotori, sia il freno elettromagnetico, devono sempre essere alimentati direttamente dalla rete.

- option **RV** - and possibly a fan with separate power supply - options **U1** or **U2** - should be specified.

*Both servo-fan and electromagnetic brake require direct connection to mains power supply.*

wird das Auswuchten des Rotors im Grad R – Option **RV** – und eventuell die Installation eines Fremdlüfters – Option **U1** oder **U2** – empfohlen. Sowohl der Fremdlüfter als auch die elektromagnetische Bremse müssen bei Frequenzumrichterbetrieb auf Grund der abfallenden Versorgungsspannung immer direkt über das Stromnetz versorgt werden.

est conseillé d'effectuer un équilibrage du rotor en niveau R - option **RV** - et de monter éventuellement un ventilateur avec alimentation séparée – options **U1** ou **U2**.

*Le servomoteur ainsi que le frein électromagnétique doivent toujours être alimentés directement par le réseau.*

## M9 - TIPO DI SERVIZIO

Se non indicato diversamente, la potenza dei motori riportata a catalogo si riferisce al servizio continuo S1.

Per i motori utilizzati in condizioni diverse da S1 sarà necessario identificare il tipo di servizio previsto con riferimento alle Norme CEI EN 60034-1.

In particolare per servizi S2 ed S3 è possibile ottenere una maggiorazione della potenza rispetto a quella prevista per il servizio continuo secondo quanto indicato nella tabella che segue, valida per i motori a singola polarità.

Per le maggiorazioni applicabili a motori a doppia polarità consultare preferibilmente il Servizio Tecnico Bonfiglioli.

## M9 - TYPE OF DUTY

*Unless otherwise specified, catalogue motor power refers to continuous duty S1.*

*Any operating conditions other than S1 duty must be identified in accordance with duty cycle definitions laid down in standards CEI EN 60034-1.*

*For duty cycles S2 and S3, the power increase coefficient reported in the following table may be used. Please note that the table provided below applies to single-speed motors.*

*Please contact Bonfiglioli Engineering for the power increase coefficients applicable to switch-pole motors.*

## M9 - BETRIEBSARTEN

Sofern nicht anderweitig angegeben, beziehen sich die im Katalog angegebene Motorleistungen auf den Dauerbetrieb S1. Bei Motoren, die unter Bedingungen eingesetzt werden, die nicht mit S1 übereinstimmen, muss die entsprechende Betriebsart unter Bezugnahme auf die Normen CEI EN 60034-1 festgelegt werden. Insbesondere kann man, für die Betriebsarten S2 und S3, durch Anwendung der in der nachstehenden Tabelle angeführten Koeffizienten der für den Dauerbetrieb vorgesehenen Leistung gegenüber eine Leistungssteigerung erzielen. Diese Tabelle gilt für einpolige Motoren. Für die polumschaltbaren Motoren sollte man sich im Hinblick auf den Leistungssteigerung, mit unserem Technischen Kundendienst in Verbindung setzen.

## M9 - TYPE DE SERVICE

*Sauf indication contraire, la puissance des moteurs indiquée dans le catalogue se réfère au service continu type S1. Pour les moteurs utilisés dans des conditions différentes de S1, il est nécessaire d'identifier le type de service en se référant aux Normes CEI EN 60034-1. Plus particulièrement, pour les types de service S2 et S3 il est possible d'obtenir une majoration de la puissance par rapport à celle prévue pour le service continu, en appliquant les coefficients indiqués dans le tableau suivant, valable pour les moteurs à simple polarité. En ce qui concerne les majorations applicables aux moteurs à double polarité, il est préférable de contacter le Service Technique Bonfiglioli.*

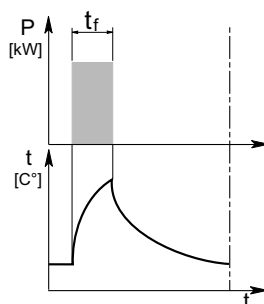
### S2

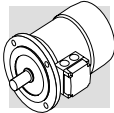
Funzionamento a carico costante per un periodo di tempo limitato, inferiore a quello richiesto per raggiungere l'equilibrio termico, seguito da un periodo di riposo di durata sufficiente a ristabilire nel motore la temperatura ambiente.

*Operation under steady loading for a limited period of time (less than the time taken to achieve thermal balance), followed by a period of time at rest long enough for engine to cool down to ambient temperature.*

Betrieb mit konstanter Last für eine begrenzte Dauer, die unter der Zeit liegt, die für das Erreichen des thermischen Gleichgewichts erforderlich ist, gefolgt von einer Aussetzzeit mit einer Dauer, die für das erneute Erreichen der Umgebungstemperatur im Motor erforderlich ist.

*Fonctionnement à charge constante pendant une période de temps limitée, inférieure à celle nécessaire pour atteindre l'équilibre thermique, suivie par une période de repos de durée suffisante pour rétablir la température ambiante dans le moteur.*





## S3

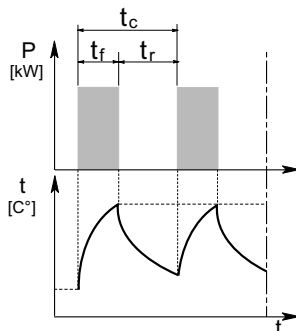
Sequenza di cicli di funzionamento identici, ciascuno comprendente un periodo di funzionamento a carico costante ed un periodo di riposo.

In questo tipo di servizio la corrente d'avviamento non influenza la sovratemperatura in modo significativo.

*A sequence of identical operation cycles, each including operation under steady loading followed by some time at rest. In this type of duty, starting current has no significant effect on overtemperature.*

Betriebsweise mit identischen Betriebszyklen, von denen jeder Zyklus eine Betriebsdauer mit konstanter Last und eine Aussetzzeit einschliesst. Bei dieser Betriebsart beeinflusst der Anlaufstrom die Übertemperatur in keinerlei ausschlaggebender Weise.

*Séquence de cycles de fonctionnement identiques, comprenant chacun une période de fonctionnement à charge constante et une période de repos. Dans ce type de service, le courant de démarrage n'influence pas l'excès de température de façon significative.*



|                  |                                                                                              |                                                                                                                                                                                             |
|------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (14)             | Tipo di Servizio<br>Type of duty<br>Betriebsart<br>Type de service                           | Potenza ammissibile in p.u. della potenza in S1<br>Permitted power in p.u. of S1 power<br>Zulässige Leistung in % der Leistung bei S1<br>Puissance admissible en p.u. de la puissance en S1 |
|                  | Durata / Duration / Dauer / Durée                                                            |                                                                                                                                                                                             |
| <b>S2</b>        | 10 min                                                                                       | 1.35                                                                                                                                                                                        |
|                  | 30 min                                                                                       | 1.15                                                                                                                                                                                        |
|                  | 60 min                                                                                       | 1.05                                                                                                                                                                                        |
|                  | Rapporto di intermittenza<br>Intermittence / Schaltverhältnis<br>Rapport d'intermittence (I) |                                                                                                                                                                                             |
| <b>S3</b>        | 25 %                                                                                         | 1.25                                                                                                                                                                                        |
|                  | 40 %                                                                                         | 1.15                                                                                                                                                                                        |
|                  | 60 %                                                                                         | 1.10                                                                                                                                                                                        |
| <b>S4 ... S9</b> | Interpellarci / Contact us / Setzen Sie sich mit uns in Verbindung / Nous contacter          |                                                                                                                                                                                             |

$$I = \frac{t_f}{t_f + t_r} \cdot 100$$

$t_f$  = tempo di funzionamento sotto carico  
 $t_r$  = tempo di riposo

$t_f$  = work time under constant load  
 $t_r$  = rest time

$t_f$  = Betriebszeit mit konstanter Last  
 $t_r$  = Aussetzzeit

$t_f$  = temps de fonctionnement à charge constante  
 $t_r$  = temps de repos

La durata del ciclo dovrà essere  $\leq 10$  min. Per durate superiori interpellarci.

Cycle duration must be up to 10 min. Please contact us when cycle duration exceeds this limit.

Die Zyklusdauer muss  $\leq 10$  min. betragen. Falls der Zyklus länger sein sollte, setzen Sie sich bitte mit unserem Kundendienst in Verbindung.

La durée du cycle devra être  $\leq 10$  min. Pour des durées supérieures, nous contacter.

## M10 - MORSETTIERA MOTORE

La morsettiera principale è a 6 morsetti per collegamento con capicorda (esecuzione a 9 morsetti per tensioni americane "dual voltage" - vedi par. M7.1). All'interno della scatola copri-

## M10 - TERMINAL BOX

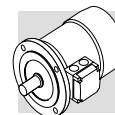
The main terminal box has 6 terminals for connection to lead-in wires (9-terminal version is supplied for "dual voltage" US voltage ratings - see M7.1). The ground terminal for earth

## M10 - MOTORKLEMMENKASTEN

Der Klemmenkasten hat ein Klemmbrett mit 6 Klemmen für einen Anschluss über Kabelschuhe (für die amerikanischen Spannungswerte "dual voltage" sind 9 Klemmen vorgesehen - siehe

## M10 - BORNIER MOTEUR

Le bornier principal est de type à 6 bornes pour raccordement avec cosses (exécution à 9 bornes pour les tensions américaines "dual voltage" - voir M7.1). A l'intérieur du couvercle du



morsetti è previsto il morsetto di terra per il collegamento del conduttore di protezione.

Le dimensioni dei terminali sono riportati nella tabella (15). Per l'alimentazione del freno vedi par. M25 (freno FD), M26 + M27 (freno FA e BA).

Nei motori in forma costruttiva IM B3 la scatola coprimorsetti è posta in alto (posizione opposta ai piedi).

Eseguire i collegamenti elettrici secondo gli schemi riportati all'interno della scatola coprimorsetti o nei manuali d'uso.

*lead connection is housed in the terminal box.*

*Terminal sizes are listed in the table (15).*

*For brake power supply, please read par. M25 (brake FD), M26 + M27 (brake FA and BA).*

*In motor design IM B3, the terminal box is top mounted (side opposite to feet).*

*Please refer to the wiring diagrams reported inside the terminal box, or in the operating instructions, for correct wiring.*

M7.1. Im Inneren des Klemmenkastens ist ein Erdungsanschluß für den Anschluss des Schutzleiters vorgesehen. Die Abmessungen der Anschlüsse werden in der Tabelle (15) angegeben. Für Informationen über die Bremsversorgung verweisen wir an dieser Stelle auf den Par. M25 (Brems-typ FD), M26 + M27 (Brems-typ FA und BA). Bei Motoren in der Bauform IM B3 ist der Klemmenkasten oben angeordnet (den Fü-ßen entgegengesetzt).

Die elektrischen Anschlüsse müssen entsprechend den Schaltplänen, die sich im Inneren des Klemmenkästen befinden oder in den Betriebsanleitungen zu finden sind, vorgenommen werden.

*bornier se trouve la borne de terre pour le raccordement du conducteur de protection.*

*Les dimensions des bornes sont indiquées dans le tableau (15). Pour l'alimentation du frein, voir par. M25 (frein FD), M26 + M27 (frein FA et BA). Sur les moteurs de forme de construction IM B3 la boîte à bornes est située en haut (à l'opposé des pieds).*

*Effectuer les branchements électriques selon les schémas indiqués à l'intérieur du couvercle de la boîte à bornes ou dans les manuels d'instructions.*

(15)

|  | N° terminali<br><i>No. of terminals</i><br><i>Klemmen</i><br>N° bornes | Filettatura terminali<br><i>Terminal threads</i><br><i>Gewinde</i><br><i>Filetage bornes</i> | Sezione max. del conduttore mm <sup>2</sup><br><i>Wire max cross section area sq mm<sup>2</sup></i><br>Max. leiter-querschnitt mm <sup>2</sup><br><i>Section max du conducteur mm<sup>2</sup></i> |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BN 56 ... BN 90</b>                                                            | 6                                                                      | M4                                                                                           | 2.5                                                                                                                                                                                               |
| <b>BN 100 ... BN 160MR</b>                                                        | 6                                                                      | M5                                                                                           | 6                                                                                                                                                                                                 |
| <b>BN 160M ... BN 180M</b>                                                        | 6                                                                      | M6                                                                                           | 16                                                                                                                                                                                                |
| <b>BN 180L ... BN 200L</b>                                                        | 6                                                                      | M8                                                                                           | 25                                                                                                                                                                                                |

#### M10.1 - INGRESSO CAVI

Nell'esecuzione standard l'ingresso dei cavi di alimentazione è previsto per pressacavo metrici in accordo alla Norma CEI EN 50262. Dimensioni e disposizioni come indicato nelle tabelle che seguono.

#### M10.1 - CABLE GLAND HOLES

*Standard cable gland holes accommodate metric-size cable glands in accordance with standard CEI EN 50262. Dimensions and locations are as shown in the following tables.*

#### M10.1 - KABELDURCHFÜHRUNG

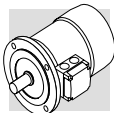
In der Standardversion ist die Ein- bzw. Durchführung der Kabel in Übereinstimmung mit der Norm CEI EN 50262 über metrische Kabelführungen vorgesehen. Maße und Anordnung werden in den folgenden Tabellen angegeben.

#### M10.1 - ENTREE CABLES

*Dans l'exécution standard, l'entrée des câbles d'alimentation est prévue pour des serre-câbles métriques, en accord avec la Norme CEI EN 50262. Dimensions et dispositions comme indiqué dans les tab. suivantes.*

(16)

| Motori flangiati (IM B5, IM B14) / <i>Flanged motors (IM B5, IM B14)</i><br>Flanschmotoren (IM B5, IM B14) / <i>Moteurs à bride (IM B5, IM B14)</i> |                                                                                                                                                  |                                                                                                       |                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|                                                                  | N° ingresso cavi e dimensione<br><i>No. &amp; size of cable gland holes</i><br>Kabeleingänge und masse<br><i>Nb entrees câbles et dimensions</i> |                                                                                                       | Ø Max. cavo [mm]<br><i>Wire max Ø [mm]</i><br>Max. Ø kabel [mm]<br><i>Ø Max câble [mm]</i> |
| BN 56 ... BN 63                                                                                                                                     | 2 x M 20 x 1.5                                                                                                                                   | 1 foro per lato<br><i>1 Hole on each side</i>                                                         | 13                                                                                         |
| BN 71 ... BN 90                                                                                                                                     | 2 x M 25 x 1.5                                                                                                                                   | 1 Bohrung pro Seite<br><i>1 Orifice par côté</i>                                                      | 17                                                                                         |
| BN 100                                                                                                                                              | 2 x M 32 x 1.5<br>2 x M 25 x 1.5                                                                                                                 | 2 fori per lato<br><i>2 Holes on each side</i>                                                        | 21<br>17                                                                                   |
| BN 112                                                                                                                                              | 2 x M 32 x 1.5<br>2 x M 25 x 1.5                                                                                                                 | 2 Bohrungen pro Seite<br><i>2 Orifices par côté</i>                                                   | 17                                                                                         |
| BN 132 ... BN 160MR                                                                                                                                 | 4 x M 32 x 1.5                                                                                                                                   |                                                                                                       | 21                                                                                         |
| BN 160M ... BN 200L                                                                                                                                 | 2 x M 40 x 1.5                                                                                                                                   | Orientabili 4 x 90°<br><i>Pivoting, 4 x 90°</i><br>Orientierbar 4 x 90°<br><i>Orientables 4 x 90°</i> | 28                                                                                         |



(17)

| Motori con piedi (IM B3 e derivati) / Footed motors (IM B3 and derived designs)<br>Motoren in Fußausführung (IM B3 und davon abgeleitete Versionen)<br>Moteurs avec pieds (IM B3 et dérivés) |                                                                                                                                |                                              |                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                              | N° ingresso cavi e dimensione<br>no. & size of cable gland holes<br>Kabeleingänge und masse<br>nb entrees câbles et dimensions |                                              | Diametro max. cavo [mm]<br>max wire diameter Ø<br>[mm]<br>Max. Ø kabel [mm]<br>Ø max câble [mm] |
| <b>BN 63</b>                                                                                                                                                                                 | 2 x M 16 x 1.5                                                                                                                 | 1 foro per lato<br>1 hole on each side       | 10                                                                                              |
| <b>BN 71 ... BN 80</b>                                                                                                                                                                       | 2 x M 20 x 1.5                                                                                                                 | 1 Bohrung pro Seite<br>1 orifice par côté    | 13                                                                                              |
| <b>BN 90</b>                                                                                                                                                                                 | 2 x M 25 x 1.5                                                                                                                 |                                              | 17                                                                                              |
| <b>BN 100 ... BN 112</b>                                                                                                                                                                     | 4 x M 25 x 1.5                                                                                                                 | 2 fori per lato<br>2 holes on each side      | 17                                                                                              |
| <b>BN 132</b>                                                                                                                                                                                | 4 x M 32 x 1.5                                                                                                                 | 2 Bohrungen pro Seite<br>2 orifices par côté | 21                                                                                              |

#### M11 - FORME COSTRUTTIVE

I motori sono previsti nelle forme costruttive IM B3, IM B5, IM B14 e derivate in accordo alla Norma CEI EN 60034-7, come indicato nella tabella seguente.

#### M11 - DESIGN VERSIONS

Motors are available in the design versions IM B3, IM B5, IM B14 and derived versions in accordance with standard CEI EN 60034-7, as outlined in the table below.

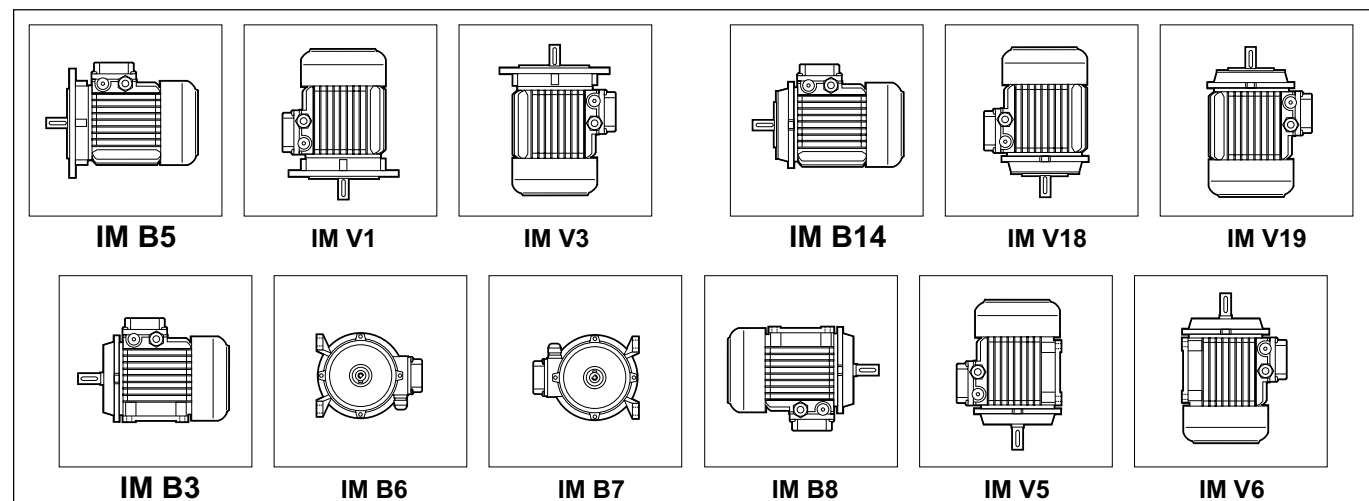
#### M11 - BAUFORMEN

Die Motoren sind in den Bauformen IM B3, IM B5, IM B14 und abgeleitete Versionen erhältlich und wurden in Übereinstimmung mit der Norm CEI EN 60034-7, entsprechend den Angaben in der nachstehenden Tabelle, realisiert.

#### M11 - FORMES DE CONSTRUCTION

Les moteurs sont disponibles dans les formes de construction IM B3, IM B5, IM B14 et dérivées, en accord avec la Norme CEI EN 60034-7, comme indiqué dans le tableau suivant.

(18)



I motori, targati esclusivamente nella forma costruttiva base, possono essere installati anche nelle forme costruttive derivate, come illustrato nella tabella seguente:

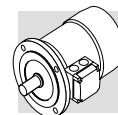
Motors in the derived design versions may also be installed as outlined in the table below. however, note that motor name plate will report the corresponding basic design version:

Die Motoren werden auf dem Typenschild in der Einbaulage B3 angegeben, sie können aber auch in den anderen, in der nachfolgenden Tabelle angegebenen Bauformen montiert werden:

Les moteurs, marqués exclusivement dans la forme de construction de base, peuvent aussi être installés dans les formes de construction dérivées, comme indiqué dans le tableau suivant :

(19)

| Forma costruttiva base<br>Basic design version<br>Grundbauforn<br>Forme de construction de base | Forma costruttiva derivata / Derived design version<br>Andere Einbaulagen / Forme de construction dérivée |        |       |       |       |
|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|--------|-------|-------|-------|
| <b>IM B3</b>                                                                                    | IM B6                                                                                                     | IM B7  | IM B8 | IM V5 | IM V6 |
| <b>IM B5</b>                                                                                    | IM V1                                                                                                     | IM V3  |       |       |       |
| <b>IM B14</b>                                                                                   | IM V18                                                                                                    | IM V19 |       |       |       |



Nelle installazioni con l'albero rivolto verso il basso è consigliabile specificare l'opzione **RC** - tettuccio parapiooggia, vedi par. M23 in particolar modo nel caso di motore autofrenante.

I motori in forma flangiata possono essere forniti con dimensioni di accoppiamento ridotte, corrispondenti alle forme costruttive B5R o B14R, con dimensioni dettagliate nella tabella seguente:

*If motor is to be installed with the shaft pointing downwards, the rain canopy option **RC** – see par. M23 is recommended, especially where a brake motor is used.*

*Flange output motors are also available with reduced coupling dimensions corresponding to design versions B5R or B14R. Dimensions are indicated in the table below:*

Bei Anwendungen mit senkrecht unten zeigender Welle, wird empfohlen, den Motor mit der Option **RC** – Schutzdach, siehe M23 zu bestellen, insbesondere dann, wenn es sich um einen Bremsmotor handelt. Die Motoren mit Flansch können mit reduzierten Wellen- und Flanschmaßen geliefert werden, die den Bauformen B5R oder B14R entsprechen und folgende Maße aufweisen:

*En ce qui concerne les installations avec arbre dirigé vers le bas, il est conseillé de spécifier l'option **RC** – capot antipluie, voir par. M23 plus particulièrement en cas de moteur frein. Les moteurs avec bride peuvent être fournis avec des dimensions d'accouplement réduites, correspondant aux formes de construction B5R ou B14R, avec les dimensions détaillées dans le tableau suivant :*

(20)

|                            |              |              |              |               |               |               |
|----------------------------|--------------|--------------|--------------|---------------|---------------|---------------|
|                            |              |              |              |               |               |               |
|                            | <b>BN 71</b> | <b>BN 80</b> | <b>BN 90</b> | <b>BN 100</b> | <b>BN 112</b> | <b>BN 132</b> |
|                            | DxE - Ø      |              |              |               |               |               |
| <b>B5R</b> <sup>(1)</sup>  | 11x23 - 140  | 14x30 - 160  | 19x40 - 200  | 24x50 - 200   | 24x50 - 200   | 28x60 - 250   |
| <b>B14R</b> <sup>(2)</sup> | 11x23 - 90   | 14x30 - 105  | 19x40 - 120  | 24x50 - 140   | —             | —             |

<sup>(1)</sup> Flangia con fori passanti  
<sup>(2)</sup> Flangia con fori filettati

<sup>(1)</sup> Flange with through holes  
<sup>(2)</sup> Flange with tapped holes

<sup>(1)</sup> Flanschen mit durchgehenden Bohrungen  
<sup>(2)</sup> Flansch mit Gewindebohrungen

<sup>(1)</sup> Bride avec orifices passants  
<sup>(2)</sup> Bride avec orifices filetés

## M12 - VENTILAZIONE

I motori sono raffreddati mediante ventilazione esterna (IC 411 secondo CEI EN 60034-6) e sono provvisti di ventola radiale in plastica, funzionante in entrambi i versi di rotazione.

L'installazione dovrà assicurare una distanza minima della calotta copriventola dalla parete più vicina, in modo da non creare impedimento alla circolazione dell'aria, oltre che permettere l'esecuzione della manutenzione ordinaria del motore e, se presente, del freno.

Su richiesta, a partire dalla grandezza BN 71, i motori possono essere forniti con ventilazione forzata ad alimentazione indipendente. Il raffreddamento è realizzato per mezzo di un ventilatore assiale con alimentazione indipendente, montato sulla calotta copriventola (metodo di raffreddamento IC 416).

## M12 - VENTILATION

*Motors are cooled by external ventilation systems (IC 411 in accordance with CEI EN 60034-6) and are equipped with a plastic radial fan running in both directions of rotation.*

*Installation must take into account a minimum distance of the fan cover from the nearest wall so as to ensure unobstructed air circulation. This also facilitates routine maintenance operations for motor and brake (if fitted).*

*At request, motor frame sizes BN 71 and larger may be equipped with forced ventilation with independent power supply. Motor is cooled by an axial ventilator mounted on the fan cover using an independent power supply (cooling method IC 416).*

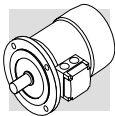
## M12 - KÜHLUNG

Die Motoren werden mittels Eigenbelüftung gekühlt (IC 411 gemäß CEI EN 60034-6) und sind mit einem Radiallüfterrad aus Kunststoff ausgestattet, das in beide Richtungen drehen kann. Bei der Montage des Motors muss darauf geachtet werden, dass zwischen Lüfterhaube und dem nächsten Bauteil ein Mindestabstand einzuhalten, damit die Luftzirkulation nicht beeinträchtigt werden kann. Dieser Abstand ist ebenso für die regelmäßige Instandhaltung des Motors und, falls vorhanden, der Bremse erforderlich. Ab der Baugröße BN 71 können die Motoren auf Anfrage mit einem unabhängig gespeisten Fremdlüfter geliefert werden. Die Kühlung erfolgt hier durch einen Axialventilator, der an Stelle der Standardlüfterhaube (Kühlmethode IC 416) montiert wird.

## M12 - VENTILATION

*Les moteurs sont refroidis par ventilation externe (IC 411 selon CEI EN 60034-6) et sont équipés de ventilateur radial en plastique fonctionnant dans les deux sens de rotation.*

*L'installation doit garantir une distance minimum du capot cache-ventilateur par rapport au mur le plus proche de façon à ne pas créer d'empêchement à la circulation de l'air ainsi que pour permettre les interventions d'entretien ordinaire du moteur et, si présent, du frein. Sur demande, à partir de la taille BN 71, les moteurs peuvent être fournis avec ventilation forcée à alimentation indépendante. Le refroidissement est réalisé au moyen d'un ventilateur axial avec alimentation indépendante monté sur le capot cache-ventilateur (méthode de refroidissement IC 416).*



Questa esecuzione è utilizzata in caso di alimentazione del motore tramite inverter allo scopo di estendere il campo di funzionamento a coppia costante anche a bassa velocità, o quando per lo stesso sono richieste elevate frequenze di avviamento. Da questa opzione sono esclusi i motori autofrenanti tipo BN\_BA e motori con doppia sporgenza d'albero (opzione PS).

*This design is adopted on inverter-controlled motors in order to extend torque-control operating range to include low speeds, or when the motor is to perform a large number of starts per hour. This option is not compatible with brake motors type BN\_BA and motors with double-extended shaft (option PS).*

Diese Ausführung sollte eingesetzt werden, falls der Motor über einen Frequenzumrichter betrieben wird, so dass der Motor bei konstantem Drehmoment auch bei niedrigen Drehzahlen oder bei hohen Anlauf Frequenzen eingesetzt werden kann. Von dieser Option ausgeschlossen sind die Bremsmotoren BN\_BA und Motoren mit zweitem Wellenende (Option PS).

*Cette exécution est utilisée en cas d'alimentation du moteur par variateur dans le but d'étendre aussi la plage de fonctionnement à couple constant aux faibles vitesses ou lorsque des fréquences de démarrage élevées sont nécessaires à celui-ci. Les moteurs frein type BN\_BA et les moteurs avec arbre sortant des deux côtés (option PS) sont exclus de cette option.*

**Tabella dati di alimentazione elettrica** **Power supply chart**

**Tabelle – Daten der Stromversorgung**

**Tableau caractéristiques de l'alimentation électrique**

(21)

| BN  <b>U1</b> | V a.c. $\pm 10\%$       | Hz      | P [W] | I [A]       |
|------------------------------------------------------------------------------------------------|-------------------------|---------|-------|-------------|
| BN 71                                                                                          | 1 ~ 230                 | 50 / 60 | 22    | 0.14        |
| BN 80                                                                                          |                         |         | 22    | 0.14        |
| BN 90                                                                                          |                         |         | 40    | 0.25        |
| BN 100                                                                                         |                         |         | 50    | 0.25        |
| BN 112                                                                                         | 3 ~ 230 $\Delta$ / 400Y | 50      | 50    | 0.26 / 0.15 |
| BN 132 ... BN 160MR                                                                            |                         |         | 110   | 0.38 / 0.22 |
| BN 160M ... BN 180M                                                                            |                         |         | 180   | 1.25 / 0.72 |
| BN 180L ... BN 200L                                                                            |                         |         | 250   | 1.51 / 0.87 |

(22)

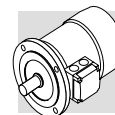
| BN  <b>U2</b> | V a.c. $\pm 10\%$       | Hz      | P [W] | I [A]       |
|--------------------------------------------------------------------------------------------------|-------------------------|---------|-------|-------------|
| BN 71                                                                                            | 1 ~ 230                 | 50 / 60 | 22    | 0.14        |
| BN 80                                                                                            |                         |         | 22    | 0.14        |
| BN 90                                                                                            |                         |         | 40    | 0.25        |
| BN 100                                                                                           |                         |         | 40    | 0.24 / 0.14 |
| BN 112                                                                                           | 3 ~ 230 $\Delta$ / 400Y | 50      | 50    | 0.26 / 0.15 |
| BN 132 ... BN 160MR                                                                              |                         |         | 110   | 0.38 / 0.22 |

Per la variante sono disponibili due esecuzioni alternative, denominate **U1** e **U2**, aventi lo stesso ingombro in senso longitudinale. Per entrambe le esecuzioni, la maggiore lunghezza della calotta copriventola ( $\Delta L$ ) è riportata nella tabella che segue. Dimensioni complessive ricavabili dalle tavole dimensionali dei motori.

*Variant is available in two alternative executions named **U1** and **U2**, featuring the same overall length. The largest length of fan cover ( $\Delta L$ ) for each configuration is reported in the following table. For overall dimensions, please see the dimension tables of motors.*

Für diese Optionsind als Alternative zwei Ausführungen verfügbar: **U1** und **U2** mit dem gleichen Längsmaßen. Für beide Ausführungen wird die Verlängerung der Lüfterhaube ( $\Delta L$ ) in der nachstehenden Tabelle wiedergegeben. Die Gesamtmaße der Motoren können den Tabellen mit den Motormaßen entnommen werden.

*Pour la variante sont disponibles deux exécutions alternatives, dénommées **U1** et **U2**, ayant le même encombrement dans le sens longitudinal. Pour les deux exécutions, la majoration de la longueur du capot cache-ventilateur ( $\Delta L$ ) est indiquée dans le tableau suivant. Dimensions totales à calculer d'après les planches de dimensions des moteurs.*



**Lunghezza aggiuntiva per motori con ventilazione indipendente**

**Extra length for motors with independent cooling**

**Zusätzliche Länge für Motoren mit unabhängiger Luftkühlung**

**Majoration longueur pour moteurs avec ventilation forcée à alimentation indépendante**

(23)

|  | $\Delta L_1$ [mm] | $\Delta L_2$ [mm] |
|-----------------------------------------------------------------------------------|-------------------|-------------------|
| <b>BN 71</b>                                                                      | 93                | 32                |
| <b>BN 80</b>                                                                      | 127               | 55                |
| <b>BN 90</b>                                                                      | 131               | 48                |
| <b>BN 100</b>                                                                     | 119               | 28                |
| <b>BN 112</b>                                                                     | 130               | 31                |
| <b>BN 132 ... BN 160MR</b>                                                        | 161               | 51                |
| <b>BN 160M ... BN 180M</b>                                                        | 184               | 184               |
| <b>BN 180L ... BN 200L</b>                                                        | 184               | 184               |

$\Delta L_1$  = variazione dimensionale rispetto alla lunghezza LB del motore standard corrispondente.

$\Delta L_1$  = dimension variation compared to length LB of the corresponding standard motor.

$\Delta L_1$  = Maßänderung gegenüber Maß LB des entsprechenden Standardmotors.

$\Delta L_1$  = variation de dimension par rapport à la cote LB du moteur standard correspondant.

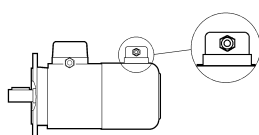
$\Delta L_2$  = variazione dimensionale rispetto alla lunghezza LB del motore autofrenante corrispondente.

$\Delta L_2$  = dimension variation compared to length LB of the corresponding brake motor.

$\Delta L_2$  = Maßänderung gegenüber Maß LB des entsprechenden Bremsmotors.

$\Delta L_2$  = variation de dimension par rapport à la cote LB du moteur frein correspondant.

## U1



Terminali di alimentazione del ventilatore in scatola morsetti separata. Nei motori autofrenanti grandezza BN 71...BN 160MR, con variante **U1**, la leva di sblocco non è collocabile nella posizione AA (vedi par. M24.1).

L'opzione non è disponibile per i motori conformi alle norme CSA e UL (opzione CUS).

*Terminals of the independent fan motor are housed in a separate terminal box. The hand release cannot be located in the AA position for brake motors size BN71...BN160MR that feature the U1 type forced cooling, as described at section M24.1.*

*The option is not applicable to motors compliant with the CSA and UL norms (option CUS).*

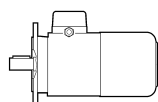
Versorgungsanschlüsse des Ventilators im Zusatzklemmenkasten. Bei den Bremsmotoren in der Baugröße BN 71...BN 160MR, mit Variante **U1** kann der Bremslufthebel nicht in der Position AA (siehe Par. M24.1) angeordnet werden.

Die Option ist nicht anwendbar für die Motoren entsprechend den Normen CSA und UL (Option CUS).

Bornes d'alimentation du ventilateur dans une boîte à bornes séparée. Pour les moteurs frein taille BN 71...BN 160MR, avec variante **U1**, le levier de déblocage ne peut être installé en position AA (voir par. M24.1).

L'option n'est pas disponible pour les moteurs conformes aux normes CSA et UL (option CUS)

## U2



Terminali di alimentazione del ventilatore nella scatola morsetti principale del motore.

L'opzione U2 non è applicabile ai motori BN160M...BN200L e ai motori con l'opzione CUS (conformi alle norme CSA e UL).

*Terminals of the fan motor are located in the main terminal box.*

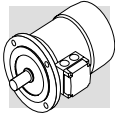
*The U2 option is not applicable to motors BN160M... BN200L and to motors with option CUS (compliant to norms CSA and UL).*

Versorgungsanschlüsse des Ventilators im Hauptklemmenkasten des Motors.

Die Option U2 ist nicht anwendbar bei den Motoren BN160M...BN200L und bei den Motoren mit der CUS-Option (entsprechend den Normen CSA und UL).

Bornes d'alimentation du ventilateur dans la boîte à bornes principale du moteur.

L'option U2 n'est pas applicable aux moteurs BN160M... BN200L et aux moteurs avec l'option CUS (conforme aux normes CSA et UL).



M13 - DESIGNAZIONE  
MOTORE

M13 - MOTOR  
DESIGNATION

M13 - MOTORBEZEICHNUNG

M13 - DESIGNATION  
MOTEUR

MOTORE / MOTOR  
MOTOR / MOTEUR

FRENO / BRAKE  
BREMSE / FREIN

**BN 63B 4 230/400-50 IP55 CLF B5 FD 3.5 R NB 220SA** ...

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OPTIONS  
OPTIONEN  
OPTIONS

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ALIMENTAZIONE FRENO  
BRAKE SUPPLY  
BREMSVERSORGUNG  
ALIMENTATION FREIN

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TIPO RADDRIZZATORE AC/DC  
RECTIFIER TYPE  
GLEICHRICHTERTYP  
TYPE ALIMENTATEUR

255

LEVA DI SBLOCCO FRENO  
BRAKE HAND RELEASE  
BREMSENTHANDLÜFTUNG  
LEVIER DE DEBLOCAGE FREIN

248

COPPIA FRENANTE/ BRAKE TORQUE  
BREMSMOMENT / COUPLE FREIN

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265

TIPO FRENO / BRAKE TYPE / BREMSENTYP / TYPE DE FREIN

253

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FORMA COSTRUTTIVA / MOTOR EXECUTION  
BAUFORM / FORME DE CONSTRUCTION

232

CLASSE ISOLAMENTO / INSULATION CLASS  
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240

GRADO DI PROTEZIONE / DEGREE OF PROTECTION  
SCHUTZART / DEGRE DE PROTECTION

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TENSIONE-FREQUENZA / VOLTAGE-FREQUENCY  
SPANNUNG-FREQUENZ / TENSION-FREQUENCE

221

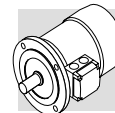
NUMERO DI POLI / NUMBER OF POLES / POLZAHL / N.br POLES  
2, 4, 6, 8, 2/4, 2/6, 2/8, 2/12, 4/6, 4/8

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GRANDEZZA MOTORE / MOTOR SIZE / MOTOR-BAUGROSSE / TAILLE MOTEUR  
56 - 200L

267

BN

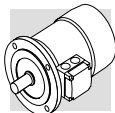

**M14 - VARIANTI E OPZIONI**
**M14 - VARIANTS  
AND OPTIONS**
**M14 - OPTIONEN**
**M14 - VARIANTES  
ET OPTIONS**
**VARIANTI**
**VARIANTS**
**OPTIONEN**
**VARIANTES**

| Descrizione<br>Description<br>Beschreibung<br>Description                            |                              | Default<br>Default<br>Standard<br>Par défaut | Opzione<br>Option<br>Option<br>Option |           |     |
|--------------------------------------------------------------------------------------|------------------------------|----------------------------------------------|---------------------------------------|-----------|-----|
| Tensione-frequenza<br>Voltage-frequency<br>Spannung-Frequenz<br>Tension-fréquence    |                              | 230/400-50                                   |                                       |           | 221 |
| Grado di protezione<br>Protection class<br>Schutzart<br>Degré de protection          | <b>BN</b>                    | IP 55                                        | IP 56                                 |           | 238 |
|                                                                                      | <b>BN_FD</b><br><b>BN_FA</b> | IP 54                                        | IP 55                                 |           |     |
|                                                                                      | <b>BN_BA</b>                 | IP 55                                        | -                                     |           |     |
| Classe di isolamento<br>Insulation class<br>Isolierstoffklasse<br>Classe d'isolation |                              | CL F                                         | CLH                                   |           | 240 |
| Forma costruttiva<br>Design version<br>Bauform<br>Forme de construction              |                              | <b>B5</b>                                    | <b>B14</b>                            | <b>B3</b> | 232 |

**OPZIONI**
**OPTIONS**
**OPTIONEN**
**OPTIONS**

| Descrizione / Description<br>Beschreibung / Description                                                                   | Valori / Catalogue numbers<br>Werte / Valeurs |            |            |     |
|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------------|------------|-----|
| Protezioni termiche<br>Thermal protective devices<br>Thermische Wicklungsschutz<br>Protections thermiques                 | <b>D3</b>                                     | <b>E3</b>  |            | 241 |
| Potenza normalizzata a 50 Hz<br>50 Hz normalized power<br>Auf 50 Hz genormte Leistung<br>Puissance normalisée à 50 Hz     | <b>PN</b>                                     |            |            | 225 |
| Dispositivi di retroazione<br>Feedback devices<br>Signalrückführungen ( Drehgeber )<br>Dispositifs de rétroaction         | <b>EN1</b>                                    | <b>EN2</b> | <b>EN3</b> | 243 |
| Riscaldatori anticondensa<br>Anti-condensate heaters<br>Wicklungsheizung<br>Réchauffeurs anticondensation                 | <b>H1</b>                                     |            |            | 244 |
| Tropicalizzazione avvolgimenti<br>Tropicalized windings<br>Tropenschutz der Motorwicklungen<br>Tropicalisation bobinages  | <b>TP</b>                                     |            |            | 244 |
| Doppia estremità d'albero<br>Double-extended shaft<br>Zweites Wellenende<br>Arbre à double extrémité                      | <b>PS</b>                                     |            |            | 244 |
| Equilibratura rotore in grado R<br>Rotor balancing grade R<br>Rotorauswuchtung mit Grad R<br>Équilibrage rotor en degré R | <b>RV</b>                                     |            |            | 245 |
| Protezioni meccaniche esterne<br>External mechanical protections<br>Schutzdächer<br>Protections mécaniques extérieures    | <b>RC</b>                                     | <b>TC</b>  |            | 246 |
| Ventilazione forzata<br>Forced ventilation<br>Fremdlüfter<br>Ventilation forcée                                           | <b>U1</b>                                     | <b>U2</b>  |            | 235 |
| Esecuzione certificata<br>Certification<br>Zertifizierte Ausführung<br>Exécution certifiée                                | <b>CUS</b>                                    |            |            | 226 |





## OPZIONI COLLEGATE AL FRENO

## BRAKE-RELATED OPTIONS

## BREMSEOPTIONEN

## OPTIONS CONCERNANT LE FREIN

| Descrizione <i>Description</i><br><i>Beschreibung / Description</i>                                                                                 | Valori / <i>Catalogue numbers</i><br><i>Werte / Valeurs</i>                                                                                                            |       |    |     | Pagina                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Coppia frenante<br><i>Brake torque</i><br>Bremsmoment<br><i>Couple de freinage</i>                                                                  | Riferirsi al particolare tipo di freno<br><i>Refer to brake type</i><br>Bezug auf den entsprechenden Bremstyp nehmen<br><i>Se référer au type de frein particulier</i> |       |    |     |  257  261  265 |
| Leva di sblocco manuale<br><i>Manual release lever</i><br>Manueller Bremsl fthebel<br><i>Clevier de d blocage manuel</i>                            | R                                                                                                                                                                      | RM    |    |     |  248                                                                                                                                                                                 |
| Orientamento leva di sblocco<br><i>Release lever orientation</i><br>Orientierung des Bremsl fthebel<br><i>Orientation levier de d blocage</i>       | AB                                                                                                                                                                     | AA    | AC | AD  |                                                                                                                                                                                                                                                                         |
| Alimentatore freno d.c.<br><i>DC brake rectifier</i><br>Stromversorgung der Bremse<br><i>Disp. d'alimentation c.c.</i>                              | NB                                                                                                                                                                     | NBR   | SB | SBR |  255                                                                                                                                                                                 |
| Volano per avviamento progressivo<br><i>Soft-start flywheel</i><br>Schwungrad f r Sanftanlauf<br><i>Volant pour d marrage progressif</i>            | F1                                                                                                                                                                     |       |    |     |  252                                                                                                                                                                                 |
| Filtro capacitivo<br><i>Capacitive filter</i><br>Kapazitiver Filter<br><i>Filtre capacitif</i>                                                      | CF                                                                                                                                                                     |       |    |     |  252                                                                                                                                                                                 |
| Alimentazione freno separata (*)<br><i>Brake separate power supply (*)</i><br>Separate Bremsversorgung (*)<br><i>Alimentation frein s par e (*)</i> | ...SA                                                                                                                                                                  | ...SD |    |     |  250                                                                                                                                                                                |

(\*) Completare con il valore di tensione.

(\*) Specify voltage.

(\*) Spannungswert eintragen.

(\*) Compl ter avec la valeur de tension.



Valori pre-impostati di default.



Default values.



Standardwerte bei Lieferung falls nicht anders spezifiziert.



Valeurs pr d finies par d faut.

## M15 - GRADO DI PROTEZIONE

## M15 - DEGREE OF PROTECTION

## M15 - SCHUTZART

## M15 - DEGRE DE PROTECTION

IP...

Nella loro esecuzione standard (non autofrenante) i motori tipo BN sono caratterizzati dal grado di protezione IP55, a richiesta   disponibile la protezione aumentata IP56.

I motori autofrenanti tipo BN\_FD e BN\_FA sono protetti in grado IP54 e, opzionalmente, in IP55. La tabella sottostante riassume la disponibilit  dei vari gradi di protezione.

Indipendentemente dal grado di protezione specificato, per installazione all'aperto i motori devono essere protetti dall'irraggiamento diretto e, nel caso di installazione con l'albero rivolto verso il basso,   necessario specificare ulteriormente il tettuccio di protezione contro l'ingresso di acqua e di corpi solidi (opzione RC).

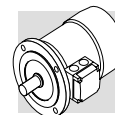
Standard BN motors (where standard means other than brake motors) are manufactured in protection class IP55. A higher protection class IP56 is available at request. Brake motors type BN\_FD and BN\_FA are in protection class IP54 or IP55 (at request).

Brake motors BN\_BA are only available in protection class IP55. The following table provides an overview of available protection classes.

Regardless of the protection class specified on order, motors to be installed outdoors require protection against direct sunlight and in addition – when they are to be installed with the shaft pointing downwards – a rain canopy to keep out water and solid bodies (option RC).

In der Standardausf hrung (ohne Bremse) werden die Motoren vom Typ BN in Schutzart IP55 ausgeliefert. Auf Anfrage k nnen sie mit einer auf IP56 erh hten Schutzart geliefert werden. Die Bremsmotoren vom Typ BN\_FD und BN\_FA verf gen  ber die Schutzart IP54 und k nnen Optional in IP55 geliefert werden. Die Bremsmotoren vom Typ BN\_BA sind nur in der Schutzart IP55 lieferbar. In der nachstehenden Tabelle werden die jeweils zur Verf gung stehenden Schutzarten zusammengefasst. Unabh ngig von der spezifischen Schutzart m ssen die im Freien installierten Motoren vor direkten Strahlungen gesch tzt werden. Im Fall einer senkrechten Montage, in der die Welle nach unten gerichtet ist, sollte dar ber hinaus das Schutzdach bestellt werden, das vor dem Eindringen von Wasser und festen Fremdk rpern sch tzt (Option RC).

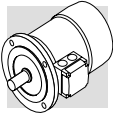
Dans l'ex cution standard (non frein), les moteurs type BN sont caract ris s par le degr  de protection IP55. Sur demande, la protection major e IP56 est aussi disponible. Les moteurs frein type BN\_FD et BN\_FA sont prot g s en degr  IP54 et, en option, en IP55. Les moteurs frein type BN\_BA sont disponibles uniquement avec degr  de protection IP55. Le tableau ci-dessous r sume la disponibilit  des diff rents degr s de protection. Ind pendamment du degr  de protection sp cifi , en cas d'installation en plein air, les moteurs doivent  tre prot g s des rayons directs du soleil et, en cas d'installation avec arbre dirig  vers le bas, il est n cessaire de sp cifier ult rieurement le capot de protection contre la p n tration de l'eau et des corps solides (option RC).



(24)

|                | IP 54    | IP 55    | IP 56 |
|----------------|----------|----------|-------|
| BN             |          | standard |       |
| BN_FD<br>BN_FA | standard |          |       |
| BN_BA          |          | standard |       |

| IP |  |                                                                                                                                                                                                            | 5 |  |                                                                                                                                                                                                                                                                                                               | 5 |  |                                                                                                                                                                                                                                                                        |
|----|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0  |  | Non protetto<br>Not protected<br>Nicht geschützt<br>Non protégé                                                                                                                                            | 1 |  | Protetto contro corpi solidi estranei di $\phi \geq 50$ mm<br>Protected against extraneous solid bodies having $\phi \geq 50$ mm<br>Geschützt gegen feste Fremdkörper mit $\phi \geq 50$ mm<br>Protégé contre les corps solides étrangers de $\phi \geq 50$ mm                                                | 2 |  | Protetto contro corpi solidi estranei di $\phi \geq 12.5$ mm<br>Protected against extraneous solid bodies having $\phi \geq 12.5$ mm<br>Geschützt gegen feste Fremdkörper mit $\phi \geq 12.5$ mm<br>Protégé contre les corps solides étrangers de $\phi \geq 12.5$ mm |
|    |  |                                                                                                                                                                                                            |   |  |                                                                                                                                                                                                                                                                                                               |   |  |                                                                                                                                                                                                                                                                        |
|    |  |                                                                                                                                                                                                            |   |  |                                                                                                                                                                                                                                                                                                               |   |  |                                                                                                                                                                                                                                                                        |
|    |  |                                                                                                                                                                                                            |   |  |                                                                                                                                                                                                                                                                                                               |   |  |                                                                                                                                                                                                                                                                        |
|    |  |                                                                                                                                                                                                            |   |  |                                                                                                                                                                                                                                                                                                               |   |  |                                                                                                                                                                                                                                                                        |
|    |  |                                                                                                                                                                                                            |   |  |                                                                                                                                                                                                                                                                                                               |   |  |                                                                                                                                                                                                                                                                        |
| 1  |  | Protetto contro la caduta verticale di gocce d'acqua<br>Protected against vertical water drips<br>Geschützt gegen senkrecht einfallendes Tropfwasser<br>Protégé contre la chute verticale de gouttes d'eau | 2 |  | Protetto contro la caduta verticale di gocce d'acqua con un'inclinazione fino a 15°<br>Protected against vertical water drips inclined up to 15°<br>Geschützt gegen senkrecht einfallendes Tropfwasser bei Neigung bis 15°<br>Protégé contre la chute verticale de gouttes d'eau avec inclinaison jusqu'à 15° | 3 |  | Protetto contro la pioggia<br>Protected against rain<br>Regenwassergeschützt<br>Protégé contre la pluie                                                                                                                                                                |
|    |  |                                                                                                                                                                                                            |   |  |                                                                                                                                                                                                                                                                                                               |   |  |                                                                                                                                                                                                                                                                        |
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|    |  |                                                                                                                                                                                                            |   |  |                                                                                                                                                                                                                                                                                                               |   |  |                                                                                                                                                                                                                                                                        |
| 2  |  | Protetto contro gli spruzzi d'acqua da tutte le direzioni<br>Protected against water splashes<br>Spritzwassergeschützt<br>Protégé contre les éclaboussures d'eau                                           | 3 |  | Protetto contro i getti d'acqua<br>Protected against jets of water<br>Wasserstrahigeschützt<br>Protégé contre les jets d'eau                                                                                                                                                                                  | 4 |  | Protetto contro getti d'acqua a pressione<br>Protected against powerful jets of water<br>Gegen starke Wasserstrahlen geschützt<br>Protégé contre les jets d'eau puissants                                                                                              |
|    |  |                                                                                                                                                                                                            |   |  |                                                                                                                                                                                                                                                                                                               |   |  |                                                                                                                                                                                                                                                                        |
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| 3  |  | Protetto contro gli effetti dell'immersione temporanea<br>Protected against the effects of temporary immersion<br>Kurzzeitig wasserdicht<br>Protégé contre les effets de l'immersion temporaire            | 4 |  | Protetto contro gli effetti dell'immersione continua<br>Protected against the effects of continuous immersion<br>Nachhaltig wasserdicht<br>Protégé contre les effets de l'immersion continue                                                                                                                  | 5 |  |                                                                                                                                                                                                                                                                        |
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| 5  |  |                                                                                                                                                                                                            | 6 |  |                                                                                                                                                                                                                                                                                                               | 7 |  |                                                                                                                                                                                                                                                                        |
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| 6  |  |                                                                                                                                                                                                            | 7 |  |                                                                                                                                                                                                                                                                                                               | 8 |  |                                                                                                                                                                                                                                                                        |
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## M16 - CLASSE DI ISOLAMENTO

## M16 - INSULATION CLASS

## M16 - ISOLATIONSKLASSE

## M16 - CLASSES D'ISOLATION

### CLF

I motori di produzione Bonfiglioli impiegano, di serie, materiali isolanti (filo smaltato, isolanti, resine d'impregnazione) in classe **F**.

In genere, per i motori in esecuzione standard la sovratemperatura dell'avvolgimento statore è contenuta entro il limite di 80 K, corrispondente alla sovratemperatura di classe B.

L'accurata scelta dei componenti del sistema isolante consente l'impiego dei motori anche in climi tropicali ed in presenza di vibrazioni normali.

Per applicazioni in presenza di sostanze chimiche aggressive o di elevata umidità, è consigliabile contattare il Servizio Tecnico Bonfiglioli per la selezione del prodotto più idoneo.

*Bonfiglioli motors use class **F** insulating materials (enamelled wire, insulators, impregnation resins) as compare to the standard motor.*

*In standard motors, stator windings over temperature normally stays below the 80 K limit corresponding to class B over temperature.*

*A careful selection of insulating components makes the motors compatible with tropical climates and normal vibration.*

*For applications involving the presence of aggressive chemicals or high humidity, contact Bonfiglioli Engineering for assistance with product selection.*

Die Motoren von Bonfiglioli sind serienmäßig mit Isolierstoffen (Emaildraht, Isolierstoffen, Imprägnierharzen) der Klasse **F** ausgestattet.

Allgemein hält sich die Übertemperatur der Motoren in der Standardausführung innerhalb des Grenzwerts von 80 K, der einer Übertemperatur der Klasse B entspricht. Die sorgfältig Wahl der Komponenten des Isoliersystem gestatten den Einsatz dieser Motoren auch unter tropischen Klimabedingungen und bei Vorliegen normaler Schwingungen.

Für den Einsatz in der Nähe aggressiv wirkenden chemischen Substanzen oder bei hoher Luftfeuchtigkeit, wird empfohlen sich zur Wahl eines passenden Produktes mit unserem Technischen Kundendienst in Verbindung zu setzen.

*De série, les moteurs fabriqués par Bonfiglioli utilisent des matériaux isolants (fil émaillé, isolants, résines d'impregnation) en classe **F**.*

*En général, pour les moteurs en exécution standard, l'échauffement de l'enroulement du stator se situe dans la limite de 80 K, correspondant à un échauffement de classe B.*

*Le choix soigné des composants du système d'isolation permet d'utiliser également les moteurs dans des climats tropicaux et en présence de vibrations normales.*

*Pour des applications en présence de substances chimiques agressives, ou d'humidité élevée, il est conseillé de contacter le Service Technique Bonfiglioli pour sélectionner le produit le plus adapté.*

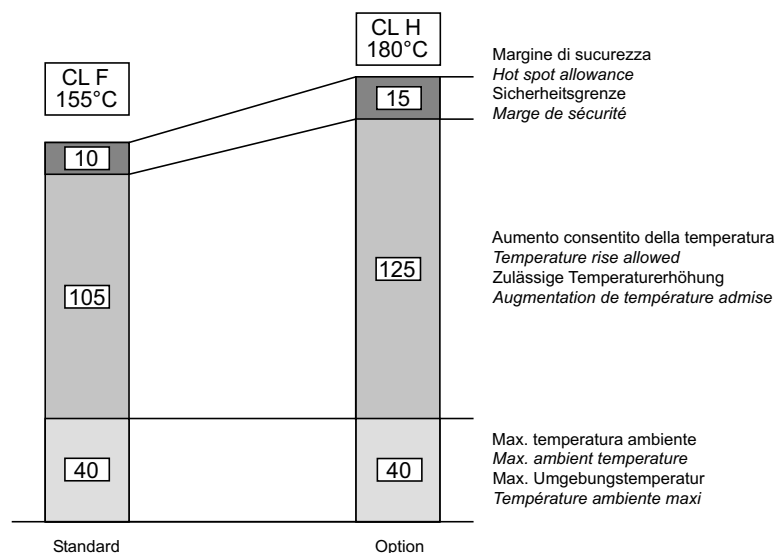
### CLH

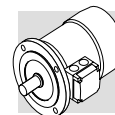
Su richiesta può venire specificata la classe di isolamento **H**.

*Motors manufactured in insulation class **H** are available at request.*

Auf Anfrage können sie auch in der Klasse **H** geliefert werden.

*Sur demande, la classe d'isolation H peut être spécifiée.*





## M17- PROTEZIONI TERMICHE

## M17- THERMAL PROTECTIVE DEVICES

## M17- THERMISCHE WICKLUNGSSCHUTZEINRICHTUNGEN

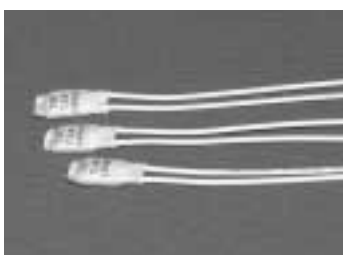
## M17- PROTECTIONS THERMIQUES

Oltre alla protezione garantita dall'interruttore magnetotermico, i motori possono essere provvisti di sonde termiche incorporate per proteggere l'avvolgimento da eccessivo riscaldamento dovuto alla scarsa ventilazione o servizio intermittente. Una protezione aggiuntiva di questo tipo dovrebbe sempre essere specificata per i motori dotati di ventilazione separata. Le varianti a disposizione sono:

*The standard thermal cut out fitted to motors may be supplemented by incorporating thermostats or thermostats to protect winding from overheating due to poor ventilation or intermittent duty. Such additional protection is highly recommended for motors with separate ventilation. Available variants are as follows:*

Abgesehen vom durch den Magnetwärmeschalter garantierten Schutz können die Motoren mit integrierten. Temperaturfühler ausgestattet werden, die die Wicklung vor Überhitzung aufgrund einer unzureichenden Lüftung oder eines Aussetzbetriebs sichern. Ein solcher zusätzlicher Schutz sollte bei Motoren mit Fremdlüftung immer verwendet werden. Die verfügbaren Optionen sind:

*Outre la protection garantie par le thermocontact moteur, les moteurs peuvent être équipés de sondes thermiques incorporées pour protéger le bobinage contre une surchauffe excessive due à une faible ventilation ou un service intermittent. Ce type de protection supplémentaire devrait toujours être prévue pour les moteurs dotés de ventilation séparée. Les variantes à disposition sont les suivantes :*

**D3**

**n° 3 sonde bimetalliche negli avvolgimenti con temperatura 150 °C**

**3 Bi-metallic thermostats in the windings, 150 °C temperature**

**3 Bimetallfühler in den Wicklungen mit einer Ansprechtemperatur von 150 °C**

**n° 3 sondes biméalliques dans les bobinages avec température de 150 °C**

I protettori di questo tipo contengono all'interno di un involucro un disco bimetallico che, raggiunta la temperatura nominale di intervento, commuta i contatti dalla posizione di riposo.

Con la diminuzione della temperatura, il disco e i contatti riprendono automaticamente la posizione di riposo.

Normalmente si impiegano tre sonde bimetalliche in serie con contatti normalmente chiusi e terminali disponibili in una morsettiera ausiliaria.

*Bimetallic thermostats consist of a bimetallic disc mounted inside a casing. Upon reaching the preset operating temperature, the disc operates the contacts causing them to disengage from the rest position.*

*As temperature decreases, disc and contacts return to the rest position.*

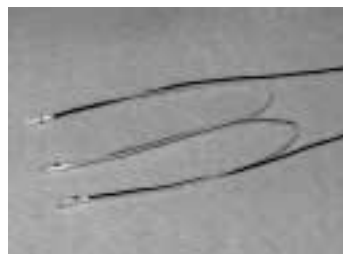
*Normally, three bimetallic thermostats connected in series with normally closed contacts and an auxiliary terminal board are used.*

Diese Schutzeinrichtungen enthalten in einer Kapsel eine Bimetallscheibe, die bei Erreichen der Nennansprechtemperatur die Kontakte aus ihrer Ruhestellung heraus schaltet. Bei abnehmender Temperatur nehmen die Scheibe und die Kontakte automatisch wieder ihre Ruhestellung ein. Normalerweise werden diese drei Bimetallfühler bei normal geschlossenen Kontakten und auf einer Hilfsklemmenleiste verfügbaren Anschlüsse in Reihe geschaltet.

*Les protecteurs de ce type contiennent, dans une enveloppe interne, un disque biméallique qui, lorsque la température nominale d'intervention est atteinte, commute les contacts de la position de repos.*

*Avec la diminution de la température, le disque et les contacts reprennent automatiquement la position de repos.*

*Normalement, on utilise trois sondes biméalliques en série avec contacts normalement fermés et extrémités disponibles dans une boîte à bornes auxiliaire.*

**E3**

**n° 3 termistori PTC negli avvolgimenti, con temperatura 150 °C**

**3 PTC thermistors in the windings, 150 °C temperature**

**3 PTC-Thermistoren in den Wicklungen mit einer Ansprechtemperatur 150 °C**

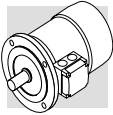
**3 thermistors PTC dans les bobinages, avec température de 150 °C**

I termistori sono semiconduttori che presentano una rapida variazione di resistenza in prossimità della temperatura nominale d'intervento. In genere sono impiegati termistori a coefficiente di temperatura positivo, anche conosciuti con la sigla PTC.

*Thermistors are semiconductors that exhibit a rapid resistance change when approaching a preset switch temperature. Normally, positive temperature coefficient (PTC) thermistors are used.*

Bei diesen Thermistoren handelt es sich um Halbleiter, die eine schnelle Änderung des Widerstands kurz vor der Nennansprechtemperatur aufweisen. Im allgemeinen werden Thermistoren mit positivem Temperaturkoeffizienten verwendet, die auch unter der Bezeichnung PTC bekannt sind.

*Les thermistors sont des semi-conducteurs qui présentent une variation rapide de résistance à proximité de la température nominale d'intervention. En général, on utilise des thermistors à coefficient de température positif, connus aussi sous le sigle PTC.*



Questi sensori presentano il vantaggio di avere ingombri ridotti, un tempo di risposta molto contenuto e la totale assenza di usura. A differenza delle sonde termiche bimetalliche i termistori non possono comandare direttamente i relais e devono pertanto essere collegati ad una particolare apparecchiatura di sgancio.  
I terminali di 3 PTC collegati in serie, sono disponibili in una morsettiera ausiliaria.

*These sensors offer such advantages as a compact, space-efficient design, very low response time and totally wear-free operation. Unlike bi-metallic thermostats, thermistors do not operate the relays directly and need to be connected to a special release device for this purpose. The terminals for three PTC thermistors connected in series are available in an auxiliary terminal board.*

Diese Sensoren haben den Vorteil kleiner Abmessungen, einer stark eingehaltenen Ansprechzeit und weisen keinerlei Verschleißerscheinungen auf. Im Unterschied zu Bimetall-Temperaturfühlern können diese Thermistoren die Relais nicht direkt schalten und müssen daher an ein spezielles Auslösegerät angeschlossen werden. Die Anschlüsse der 3 in Reihe geschalteten PTC-Thermistoren sind an einer Zusatzklemmleiste verfügbar.

*Ces capteurs présentent l'avantage d'être de dimensions réduites, leur temps de réponse est très limité et l'absence d'usure est totale. A la différence des sondes thermiques bimétalliques, les thermistors ne peuvent pas commander directement les relais, par conséquent, ils doivent être branchés à un appareil de déclenchement particulier. Les extrémités de 3 PTC reliés en série sont disponibles dans une boîte à bornes auxiliaire.*

#### M18 - DISPOSITIVI DI RETROAZIONE

#### M18 - FEEDBACK UNITS

#### M18 - ENCODER / INKREMENTALGEBER

#### M18 - DISPOSITIFS DE RETROACTION

| EN1, EN2, EN3         |  |
|-----------------------|--|
|                       |  |
| BN 63...BN 200L       |  |
| BN 63_FD...BN 200L_FD |  |
| BN 63_FA...BN 200L_FA |  |

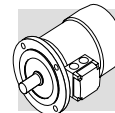
| EN_ + U1                |    |
|-------------------------|----|
|                         |    |
|                         | L3 |
| BN 160M...BN 180M       | 72 |
| BN 180L...BN 200L       | 82 |
| BN 160M_FD...BN 180M_FD | 35 |
| BN 180L_FD...BN 200L_FD | 41 |

Se l'opzione EN\_ è richiesta per motori di grandezza BN71...BN160MR, contemporaneamente all'opzione U1/U2, le variazioni dimensionali coincidono con quelle dell'opzione U1/U2.

*If the encoder device (options EN1, EN2, EN3) is specified on motors BN71...BN160MR, along with the independent fan cooling (options U1, U2), the extra length of motor is coincident with that of the correspondent U1 and U2 execution.*

Wenn der Encoder (Optionen EN1, EN2, EN3) für Motoren der Baugrößen BN71...BN160MR zusammen mit Fremdlüftung (Optionen U1, U2) ausgelegt ist, stimmen die Maßänderungen des Motors mit jenen der entsprechenden Ausführungen U1 und U2 überein.

*Si un codeur (option EN1, EN2, EN3) est nécessaire sur les moteurs de tailles BN71...BN160MR, en association avec la ventilation forcée (options U1, U2), la variation de dimensions du moteur coïncide avec celle des exécutions U1 et U2 correspondantes.*



## EN1

Encoder incrementale,  $V_{IN}=5$  V, uscita line-driver RS 422.    Incremental encoder,  $V_{IN}=5$  V, line-driver output RS 422.    Inkremental-Encoder,  $V_{IN}=5$  V, Ausgang "line-driver" RS 422.    Codeur incrémental,  $V_{IN}=5$  V, sortie line-driver RS 422.

## EN2

Encoder incrementale,  $V_{IN}=10-30$  V, uscita line driver RS 422.    Incremental encoder,  $V_{IN}=10-30$  V, line-driver output RS 422.    Inkremental-Encoder,  $V_{IN}=10-30$  V, Ausgang "line-driver" RS 422.    Codeur incrémental,  $V_{IN}=10-30$  V, sortie line-driver RS 422.

## EN3

Encoder incrementale,  $V_{IN}=12-30$  V, uscita push-pull 12-30 V.    Incremental encoder,  $V_{IN}=12-30$  V, push-pull output 12-30 V.    Inkremental-Encoder,  $V_{IN}=12-30$  V, Ausgang "push-pull" 12-30 V.    Codeur incrémental,  $V_{IN}=12-30$  V, sortie push-pull 12-30 V.

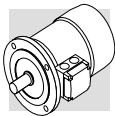
### Tabella dati tecnici

### Specifications

### Technische Daten

### Tableau des caractéristiques techniques

| (25)                                                                                                                                 |                      | EN1                                                                                                                                                           | EN2     | EN3       |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|
| Interfaccia<br>Interface<br>Schnittstelle<br>Interface                                                                               |                      | RS 422                                                                                                                                                        | RS 422  | push-pull |
| Tensione alimentazione<br>Power supply voltage<br>Versorgungsspannung<br>Tension d'alimentation                                      | [V]                  | 4...6                                                                                                                                                         | 10...30 | 12...30   |
| Tensione di uscita<br>Output voltage<br>Ausgangsspannung<br>Tension de sortie                                                        | [V]                  | 5                                                                                                                                                             | 5       | 12...30   |
| Corrente di esercizio senza carico<br>No-load operating current<br>Betriebsstrom ohne Belastung<br>Courant d'utilisation sans charge | [mA]                 | 120                                                                                                                                                           | 100     | 100       |
| N° impulsi per giro<br>No. of pulses per revolution<br>Impulse pro Drehung<br>Nombre d'impulsions par tour                           |                      | 1024                                                                                                                                                          |         |           |
| n° segnali<br>No. of signals<br>Signale<br>Nombre de signaux                                                                         |                      | 6 (A,B,C + Segnali invertiti / + Inverted signals<br>Invertierte Signale / Signaux inversés)                                                                  |         |           |
| Max. frequenza di uscita<br>Max. output frequency<br>Max. Ausgangsfrequenz<br>Fréquence max. de sortie                               | [kHz]                | 300                                                                                                                                                           | 300     | 200       |
| Max. velocità<br>Max. speed<br>Max. Drehzahl<br>Vitesse max.                                                                         | [min <sup>-1</sup> ] | 6000 (9000 min <sup>-1</sup> per 10 s )<br>6000 (9000 rpm for 10 s )<br>6000 (9000 min <sup>-1</sup> pour 10 s )<br>6000 (9000 min <sup>-1</sup> für 10 Sek.) |         |           |
| Campo di temperatura<br>Temperature range<br>Temperaturbereich<br>Plage de température                                               | [°C]                 | -20 ... +70                                                                                                                                                   |         |           |
| Grado di protezione<br>Protection class<br>Schutzgrad<br>Degré de protection                                                         |                      | IP 65                                                                                                                                                         |         |           |



## M19 - RISCALDATORI ANTICONDENSA

I motori funzionanti in ambienti molto umidi e/o in presenza di forti escursioni termiche, possono essere equipaggiati con una resistenza anticondensa. L'alimentazione monofase è prevista da morsettiera ausiliaria posta nella scatola principale.

## M19 - ANTI-CONDENSATION HEATERS

Where an application involves high humidity or extreme temperature fluctuation, motors may be equipped with an anti-condensate heater. A single-phase power supply is available in the auxiliary terminal board inside the main terminal box.

## M19 - WICKLUNGSHEIZUNG

Die Motoren, die in besonders feuchten Umgebungen und/oder unter starken Temperaturschwankungen eingesetzt werden, können mit einem Heizelement als Kondenwasserschutz ausgestattet werden. Die einphasige Versorgung erfolgt über eine Zusatzklemmenleiste, die sich im Klemmenkasten befindet.

## M19 - RECHAUFFEURS ANTICONDENSATION

Les moteurs fonctionnant dans des milieux très humides et/ou en présence de fortes plages thermiques peuvent être équipés d'une résistance anticondensation. L'alimentation monophasée est prévue par l'intermédiaire d'une boîte à bornes auxiliaire située dans la boîte principale.

**H1**



|  | H1                     |
|-----------------------------------------------------------------------------------|------------------------|
|                                                                                   | 1~ 230V ± 10%<br>P [W] |
| BN 56 ... BN 80                                                                   | 10                     |
| BN 90 ... BN 160MR                                                                | 25                     |
| BN 160M ... BN 180M                                                               | 50                     |
| BN 180L ... BN 200L                                                               | 65                     |



Durante il funzionamento del motore la resistenza anticondensa non deve mai essere alimentata.



Always remove power supply to the anti-condensate heater before operating the motor.



Während des Motorbetriebs darf die Wicklungsheizung nie gespeist werden.



Durant le fonctionnement du moteur, la résistance anticondensation ne doit jamais être alimentée.

## M20 - TROPICALIZZAZIONE

## M20 - TROPICALIZATION

## M20 - TROPENSCHUTZ

## M20 - TROPICALISATION

**TP**

Su richiesta, mediante la specifica dell'opzione **TP**, gli avvolgimenti del motore ottengono una protezione aggiuntiva che li rende idonei al funzionamento in condizioni di elevata temperatura e umidità.

When option **TP** is specified, motor windings receive additional protection for operation in high humidity and temperature conditions.

Wird die Option **TP** bestellt, wird die Motorwicklung mit einem zusätzlichen Schutz ausgestattet, der ihren Einsatz unter hohen Temperaturen und starker Feuchtigkeit ermöglicht.

Sur demande, en spécifiant l'option **TP**, les bobinages du moteur obtiennent une protection supplémentaire qui les rend apte au fonctionnement dans des conditions de température et d'humidité élevées.

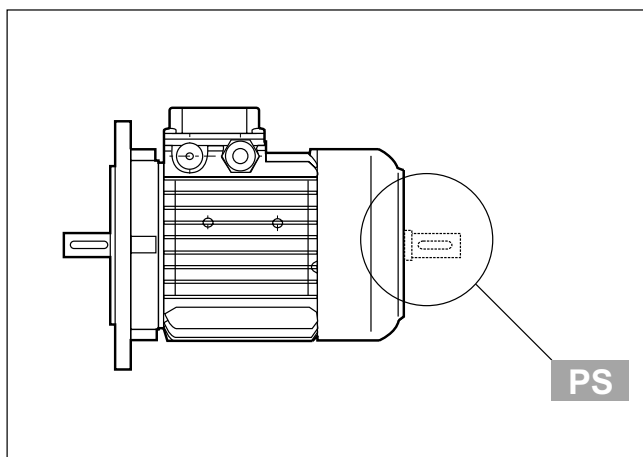
## M21 - ESECUZIONI ALBERO

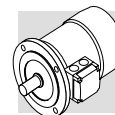
## M21 - ROTOR SHAFT CONFIGURATIONS

## M21 - OPTIONEN DER ROTORWELLE

## M21 - EXECUTIONS ARBRE ROTOR

**PS**





## Seconda estremità d'albero

L'opzione esclude le varianti RC, TC, U1, U2, EN1, EN2, EN3 – non applicabile ai motori con freno tipo BA.

Le dimensioni sono reperibili nelle tavole dimensionali dei motori.

## Second shaft extension

*This option is not compatible with variants RC, TC, U1, U2, EN1, EN2, EN3 – and is not feasible on motors equipped with BA brake.*

*For shaft dimensions please see motor dimensions tables.*

## Zweites Wellenende

Diese Option schließt die Optionen RC, TC, U1, U2, EN1, EN2, EN3 aus – sie kann nicht außerdem nicht an Motoren, die mit einer Bremse vom Typ BA ausgestattet sind, angebaut werden. Die entsprechenden Maße können den Maßtabellen der Motoren entnommen werden.

## Arbre à double extrémité

*L'option exclut les variantes RC, TC, U1, U2, EN1, EN2, EN3 – non applicables aux moteurs avec frein type BA.*

*Les dimensions figurent sur les planches de dimensions des moteurs.*

## M22 - EQUILBRATURA ROTORE

I motori sono equilibrati dinamicamente con mezza linguetta e rientrano nel grado di vibrazione **N**, secondo la Norma CEI EN 60034-14.

## M22 - ROTOR BALANCING

*Motors are dynamically balanced with a half key and fall within vibration class **N** in accordance with standard CEI EN 60034-14.*

## M22 - ROTORAUSWUCHTUNG

Die Motoren werden dynamisch durch das Einsetzen eines halben Federkeils ausgewuchtet und fallen der Norm CEI EN 60034-14 gemäß unter die Einstufung **N** des Schwingungsgrads.

## M22 - EQUILIBRAGE DU ROTOR

*Les moteurs sont équilibrés du point de vue dynamique avec une demi-clavette et rentrent dans le degré de vibration **N**, selon la norme CEI EN 60034-14.*

## RV

Per esigenze di particolare silenziosità è disponibile l'esecuzione opzionale **RV** che garantisce vibrazioni ridotte, secondo il grado **R**.

La tabella sottostante riporta i valori della velocità efficace di vibrazione per equilibratura normale (N) e in grado R.

*Where low noise is a priority requirement, the option **RV** ensures reduced vibration in accordance with vibration class **R**. The table below reports effective velocity of vibration for normal (N) and R grade balancing.*

Sollte eine besondere Laufruhe gefordert werden, steht als Option **RV** eine Ausführung mit reduziertem Schwingverhalten nach Grad **R**, zur Verfügung. Die folgende Tabelle gibt die Werte der effektive Schwingungen für das normale Auswuchten (N) und im Grad R an.

*En cas d'exigence particulière de faible niveau de bruit, l'exécution **RV** est disponible en option, elle garantit des vibrations réduites, de degré **R**.*

*Le tableau ci-dessous indique les valeurs de la vitesse efficace de vibration pour un équilibrage normal (N) et en degré R.*

(26)

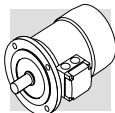
| Grado di vibrazione<br>Vibration class<br>Schwingungsklasse<br>Degré de vibration | Velocità di rotazione<br>Synchronous speed<br>Drehungsgeschwindigkeit<br>Vitesse de rotation<br><br>n [min <sup>-1</sup> ] | Limiti della velocità di vibrazione<br>Limits of the vibration velocity<br>Grenzen der Schwingungsgeschwindigkeit<br>Limites de la vitesse de vibration<br>(mm/s) |               |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
|                                                                                   |                                                                                                                            | 63 < H ≤ 132                                                                                                                                                      | 132 < H ≤ 200 |
| <b>N</b>                                                                          | 600 < n < 3600                                                                                                             | 1.8                                                                                                                                                               | 2.8           |
| <b>R</b>                                                                          | 600 < n < 1800                                                                                                             | 0.71                                                                                                                                                              | 1.12          |
|                                                                                   | 1800 < n < 3600                                                                                                            | 1.12                                                                                                                                                              | 1.8           |

I valori si riferiscono a misure con motore liberatamente sospeso e funzionamento a vuoto; tolleranza ±10%.

*Values are obtained from measurements on freely suspended motor during no-load operation; tolerance ± 10%.*

Diese Werte beziehen sich auf einem frei hängenden und sich im Leerbetrieb befindlichen Motor; Toleranz ± 10%.

*Les valeurs se réfèrent à des mesures avec moteur librement suspendu et fonctionnement à vide, tolérance ± 10%.*



## M23 - PROTEZIONI MECCANICHE ESTERNE

## M23 - EXTERNAL MECHANICAL PROTECTIONS

## M23 - MECHANISCHE SCHUTZVORRICHTUNGEN

## M23 - PROTECTIONS MECANIQUES EXTERIEURES

### RC

Il dispositivo parapioggia, che è raccomandato quando il motore è montato verticalmente con l'albero verso il basso, serve a proteggere il motore stesso dall'ingresso di corpi solidi e dallo stillicidio. Le dimensioni aggiuntive sono indicate nella tabella (27).

Il tettuccio esclude le varianti PS, EN1, EN2, EN3 e non è applicabile ai motori con freno tipo BA.

*The rain canopy protects the motor from dripping and avoids the ingress of solid matter. It is recommended when motor is installed in a vertical position with the shaft pointing downwards.*

*Relevant dimensions are indicated in the table (27).*

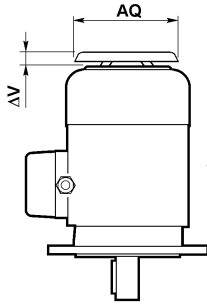
*The rain canopy is not compatible with variants PS, EN1, EN2, EN3 and will not fit motors equipped with a BA brake.*

Ein Regenschutzdach, dessen Montage empfohlen wird, wenn der Motor senkrecht mit einer nach unten gerichteten Welle montiert wird. Es dient dem Schutz des Motors vor dem Eindringen von festen Fremdkörpern und Tropfwasser. Die Dimensionen werden in der Tabelle (27) angegeben. Das Schutzdach schließt die Möglichkeit der Optionen PS, EN1, EN2, EN3 aus und kann bei Bremsmotoren vom Typ BN\_BA nicht montiert werden.

*Le capot de protection antipluie est recommandé lorsque le moteur est monté verticalement avec l'arbre vers le bas, il sert à protéger le moteur contre l'introduction de corps solides et le suintement. Les dimensions à ajouter sont indiquées dans le tableau (27).*

*Le capot antipluie exclue les variantes PS, EN1, EN2, EN3 et n'est pas applicable aux moteurs avec frein type BA.*

(27)

|  | AQ  | $\Delta V$ |  |
|-----------------------------------------------------------------------------------|-----|------------|--------------------------------------------------------------------------------------|
| <b>BN 63</b>                                                                      | 118 | 24         |                                                                                      |
| <b>BN 71</b>                                                                      | 134 | 27         |                                                                                      |
| <b>BN 80</b>                                                                      | 134 | 25         |                                                                                      |
| <b>BN 90</b>                                                                      | 168 | 30         |                                                                                      |
| <b>BN 100</b>                                                                     | 168 | 28         |                                                                                      |
| <b>BN 112</b>                                                                     | 211 | 32         |                                                                                      |
| <b>BN 132 ... BN 160MR</b>                                                        | 211 | 32         |                                                                                      |
| <b>BN 160M ... BN 180M</b>                                                        | 270 | 36         |                                                                                      |
| <b>BN 180L ... BN 200L</b>                                                        | 310 | 36         |                                                                                      |

### TC

La variante del tettuccio tipo TC è da specificare quando il motore è installato in ambienti dell'industria tessile, dove sono presenti filamenti che potrebbero ostruire la griglia del copriven-tola, impedendo il regolare flusso dell'aria di raffreddamento.

L'opzione esclude le varianti EN1, EN2, EN3 e non è applicabile ai motori con freno tipo BA.

L'ingombro complessivo è lo stesso del tettuccio tipo RC.

*Option TC is a rain canopy variant for textile industry environments, where lint may obstruct the fan grid and prevent a regular flow of cooling air.*

*This option is not compatible with variants EN1, EN2, EN3 and will not fit motors equipped with a BA brake.*

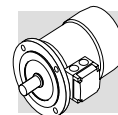
*Overall dimensions are the same as rain canopy type RC.*

Bei dieser Option handelt es sich um ein Schutzdach mit einem Textilnetz, dessen Einsatz empfohlen wird wenn der Motor in Bereichen der Textilindustrie installiert wird, in denen Stofffusseln das Lüfterradgitter verstopfen und so einen ausreichenden Kühlluftfluss verhindern könnten. Diese Option schließt die Möglichkeit der Optionen EN1, EN2, EN3 aus und kann bei Bremsmotoren vom Typ BN\_BA nicht montiert werden.

Die Gesamtmaße entsprechen denen des Schutzdachs vom Typ RC.

*La variante du capot type TC est à spécifier lorsque le moteur est installé dans des sites de l'industrie textile, où sont présents des filaments qui pourraient obstruer la grille du cache-ventilateur et empêcher le flux régulier de l'air de refroidissement. L'option exclue les variantes EN1, EN2, EN3 et n'est pas applicable aux moteurs avec frein type BA.*

*L'encombrement total est identique à celui du capot type RC.*



## M24 - MOTORI ASINCRONI AUTOFRENANTI

### Funzionamento

L'esecuzione autofrenante prevede l'impiego di freni a pressione di molle alimentati in c.c. (tipo FD) o in c.a. (tipo FA, BA).

Tutti i freni funzionano secondo il principio di sicurezza, ossia intervengono in seguito alla pressione esercitata dalle molle, in mancanza di alimentazione.

## M24 - ASYNCHRONOUS BRAKE MOTORS

### Operation

*Versions with incorporated brake use spring-applied DC (FD option) or AC (FA, BA options) brakes.*

*All brakes are designed to provide fail-safe operation, meaning that they are applied by spring-action in the event of power failure.*

## M24 - DREHSTROMBREMS- MOTOREN

### Betriebsweise

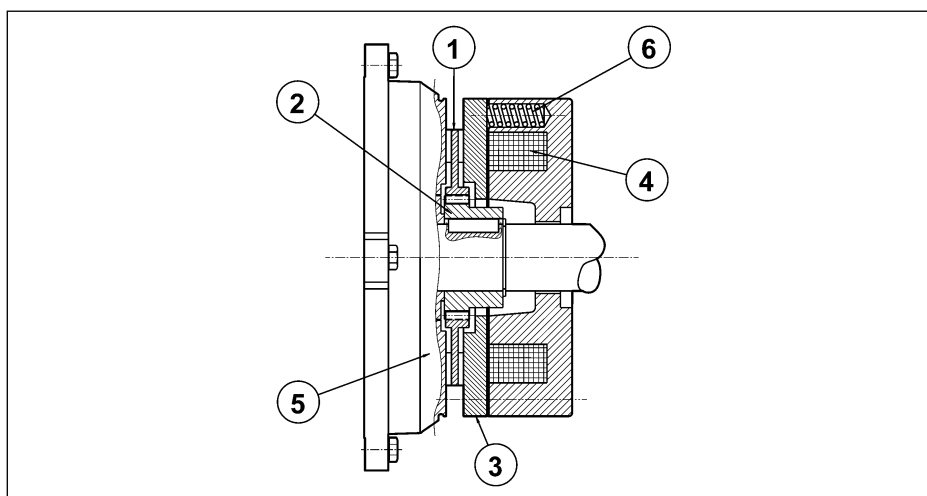
Die selbstbremsende Ausführung der Motoren sieht den Einsatz von Federdruckbremsen vor, die mit Gleichstrom (Typ FD) oder mit Wechselstrom (Typ FA, BA) gespeist werden. Alle Bremsen arbeiten gemäß dem Sicherheitsprinzip, d.h. sie greifen, im Fall eines Stromausfalls in Folge eines auf die Feder ausgeübten Drucks ein.

## M24 - MOTEURS FREIN ASYNCHRONES

### Fonctionnement

*L'exécution avec frein prévoit l'utilisation de freins à pression de ressorts alimentés en c.c. (type FD) ou en c.a. (type FA, BA). Tous les freins fonctionnent selon le principe de sécurité, c'est-à-dire qu'ils interviennent suite à la pression exercée par les ressorts, en cas de coupure d'alimentation.*

(28)



### Legenda:

- ① disco
- ② mozzo
- ③ áncora mobile
- ④ bobina
- ⑤ scudo NDE motore
- ⑥ molle

### Key:

- ① brake disc
- ② disc carrier
- ③ pressure plate
- ④ brake coil
- ⑤ motor NDE shield
- ⑥ brake springs

### Zeichenerklärung:

- ① Brems scheibe
- ② Nabe
- ③ Bewgliher Anker
- ④ Ringspule
- ⑤ Motorschild
- ⑥ Schußfedern

### Légende:

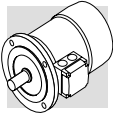
- ① disque
- ② moyeu d'entraînement
- ③ disque de freinage
- ④ flasque-frein
- ⑤ flasque arrière
- ⑥ ressort de frein

In mancanza di tensione, l'ancora mobile spinta dalle molle di pressione blocca il disco freno tra la superficie dell'ancora stessa e lo scudo motore impedendo la rotazione dell'albero. Quando la bobina viene eccitata, l'attrazione magnetica esercitata sull'ancora mobile vince la reazione elastica delle molle e libera il disco freno, e conseguentemente l'albero motore con esso solidale.

*When voltage is interrupted, pressure springs push the armature plate against the brake disc. The disc becomes trapped between the armature plate and motor shield and stops the shaft from rotation. When the coil is energized, a magnetic field strong enough to overcome spring action attracts the armature plate, so that the brake disc – which is integral with the motor shaft – is released.*

Wenn die Spannungsversorgung abfällt, sorgt der bewegliche, von den Druckfedern geschobene Anker für die Blockierung der Bremsscheibe zwischen der Ankerfläche und dem Motorschild und blockiert damit den Rotor. Wird die Spule erregt, kommt es durch den magnetischen auf den beweglichen Anker wirkenden Anzug zur Überwindung der elastischen Federkraft und zum Lösen der Bremsscheibe, wodurch der rotor wieder freigegeben wird.

*En cas de coupure de courant, l'armature mobile, poussée par les ressorts, bloque le disque de frein entre la surface de l'armature et le bouclier moteur en empêchant la rotation de l'arbre. Lorsque la bobine est excitée, l'attraction magnétique exercée sur l'armature mobile annule la réaction élastique des ressorts et libère le disque de frein, et par conséquent l'arbre moteur, qui est solidaire.*



#### Caratteristiche generali:

- Coppie frenanti elevate (generalmente  $M_b \cong 2 M_n$ ) e regolabili
- Disco freno con anima in acciaio a doppia guarnizione d'attrito (materiale a bassa usura, senza amianto)
- Cava esagonale sull'albero motore, lato ventola (N.D.E.), per rotazione manuale (non prevista quando sono presenti le opzioni PS, RC, TC, U1, U2, EN1, EN2, EN3)
- Sblocco meccanico manuale (opzioni **R** e **RM** per BN\_FD, BN\_FA).
- Trattamento anticorrosivo di tutte la superfici del freno
- Isolamento in classe F

#### Most significant features:

- *High braking torques (normally  $M_b \cong 2 M_n$ ) braking torque adjustment*
- *Steel brake disc with double friction lining (low-wear, asbestos-free lining)*
- *Hexagonal seat on motor shaft fan end (N.D.E.) for manual rotation (not compatible with options PS, RC, TC, U1, U2, EN1, EN2, EN3)*
- *Manual release lever (options **R** and **RM** for BN\_FD, BN\_FA).*
- *Corrosion-proof treatment on all brake surfaces*
- *Insulation class F*

#### Allgemeine Eigenschaften:

- Hohe und regulierbare Bremsmomente (allgemein  $M_b \cong 2 M_n$ ).
- Brems Scheibe mit Stahlkern und doppeltem Bremsbelag (Material mit geringem Verschleiß, asbestfrei).
- Sechskant hinten an der Motorwelle, auf Lüfterradseite (N.D.E.), für eine manuelle Drehung des Rotors mit einem Inbusschlüssel. (nicht lieferbar, wenn die Optionen PS, RC, TC, U1, U2, EN1, EN2, EN3) bestellt wurden.
- Manuell zu betätigende, mechanische Bremslüftvorrichtung (Optionen **R** und **RM** für BN\_FD, BN\_FA).
- Korrosionsschutzbehandlung an allen Flächen der Bremse.
- Isolierung in Klasse F.

#### Caractéristiques générales:

- *Couples de freinage élevés (généralement  $M_b \cong 2 M_n$ ) et réglables.*
- *Disque de frein avec structure en acier à double garniture de frottement (matière à faible usure, sans amiante).*
- *Empreinte hexagonale sur l'arbre moteur, côté ventilateur (N.D.E.), pour la rotation manuelle (non prévue en cas de présence des options PS, RC, TC, U1, U2, EN1, EN2, EN3).*
- *Débloccage mécanique manuel (options **R** et **RM** pour BN\_FD, BN\_FA).*
- *Traitement anticorrosion sur toute la surface du frein.*
- *Isolation en classe F.*

#### M24.1 - LEVA SBLOCCO FRENO

I freni a pressione di molle tipo **FD** e **FA** possono essere dotati opzionalmente di dispositivi per lo sblocco manuale del freno, normalmente utilizzati per condurre interventi di manutenzione sulle parti di macchina, o dell'impianto, comandate dal motore.

#### M24.1 - BRAKE RELEASE SYSTEMS

*Spring-applied brakes type **FD** and **FA** may be equipped with optional manual release devices. These are typically used for manually releasing the brake before servicing any machine or plant parts operated by the motor.*

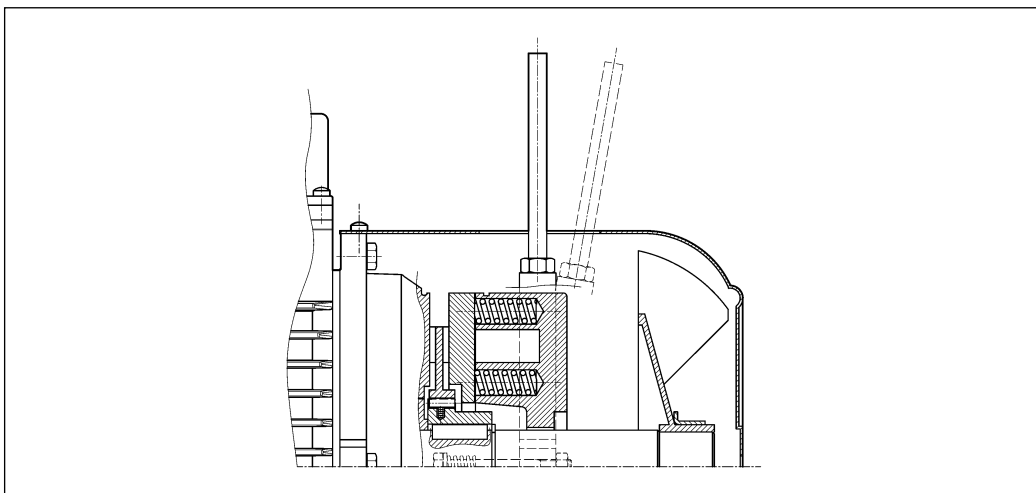
#### M24.1 - BREMSLÜFTHEBEL

Die Federdruckbremsen vom Typ **FD** und **FA** können Optional mit Bremslüfthebeln geliefert werden, die ein manuelles Lüften der Bremse ermöglichen. Diese Lüftungseinrichtungen können bei Instandhaltungsarbeiten an vom Motor betriebenen Maschinen- oder Anlagenteilen verwendet werden.

#### M24.1 - SYSTEMES DE DEBLOCCAGE FREIN

*Les freins à pression de ressorts type **FD** et **FA** peuvent, en option, être dotés de dispositifs de déblocage manuel du frein, normalement utilisés pour effectuer des interventions d'entretien sur les composants de la machine, ou de l'installation commandée par le moteur.*

**R**

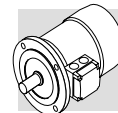


La leva di sblocco è dotata di ritorno automatico, tramite dispositivo a molla.

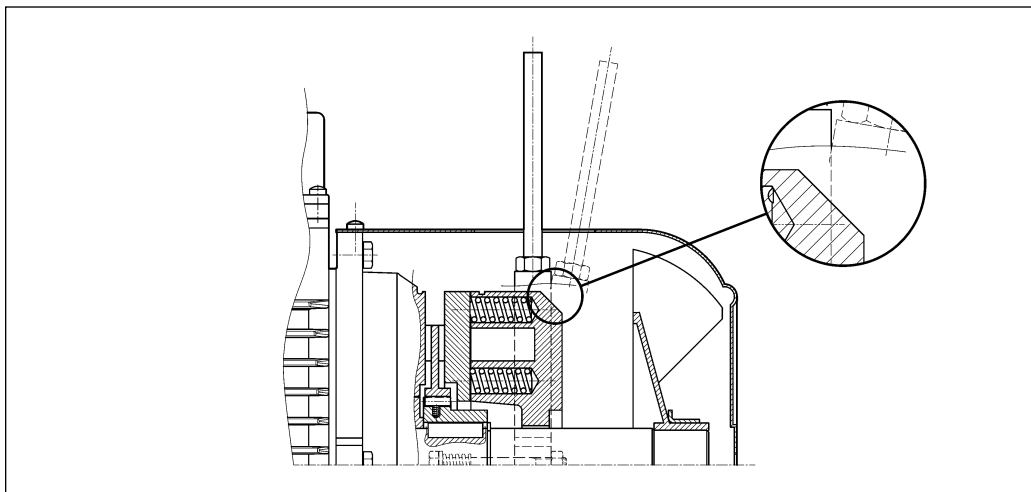
*A return spring brings the release lever back in the original position.*

Bremslüfthebel mit automatischer Rückstellung durch Federkraft.

*Le levier de déblocage est doté de retour automatique, au moyen d'un dispositif à ressort.*



**RM**



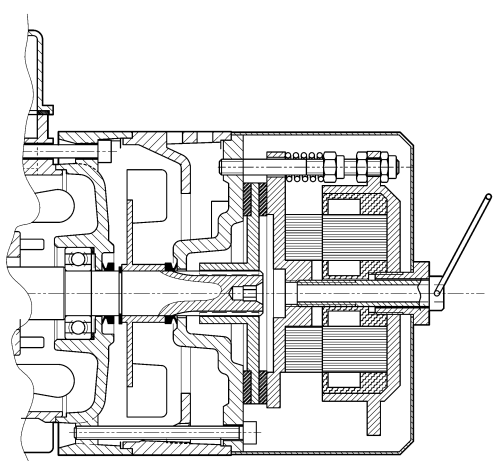
La leva di sblocco può essere temporaneamente bloccata in posizione di rilascio del freno, avvitando la stessa fino ad impegnarne l'estremità in un risalto del corpo del freno. La disponibilità dei sistemi di sblocco freno è diversa per i vari tipi di motore, ed è descritta dalla tabella seguente:

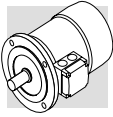
*The release lever may be locked in the "release" position by tightening the lever until lever end becomes engaged with a brake housing projection. There are different brake release systems available for the various types of motors as indicated in the table below:*

Der Bremslüfthebel kann zeitweise in der Bremslüftposition arretiert werden, indem man ihn so lange einschraubt, bis die Bremse arretiert ist. Für die unterschiedlichen Motortypen sind ebenso verschiedene Bremslüftsyste me verfügbar, die Sie der folgenden Tabelle entnehmen können:

*Le levier de déblocage peut être temporairement bloqué en position de déblocage du frein en le vissant jusqu'à engager l'extrémité dans une saillie du corps du frein. La disponibilité des systèmes de déblocage du frein est différente en fonction des types de moteur et figure dans le tableau suivant :*

(29)

|              | R                                                                                    | RM                                                                                                               |
|--------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>BN_FD</b> | $63 \leq H \leq 200$                                                                 | <b>2p</b> $63A2 \leq H \leq 132M2$<br><b>4p</b> $63A4 \leq H \leq 132MA4$<br><b>6p</b> $63A6 \leq H \leq 132MA6$ |
| <b>BN_FA</b> | $63 \leq H \leq 132$                                                                 | ⊖                                                                                                                |
| <b>BN_BA</b> |  |                                                                                                                  |



## Orientamento della leva di sblocco

Per entrambe le opzioni **R** e **RM**, la leva di sblocco del freno viene collocata, se non diversamente specificato, con orientamento di 90° in senso orario, rispetto alla posizione della morsetti - riferimento [AB] nel disegno sottostante.

Orientamenti alternativi, tipo **[AA]**, **[AC]** e **[AD]** possono essere richiesti citandone la relativa specifica:

## Release lever orientation

*Unless otherwise specified, the release lever is located 90° away from the terminal box – identified by letters [AB] in the diagram below – in a clockwise direction on both options **R** and **RM**.*

*Alternative lever positions **[AA]**, **[AC]** and **[AD]** are also possible when the corresponding option is specified:*

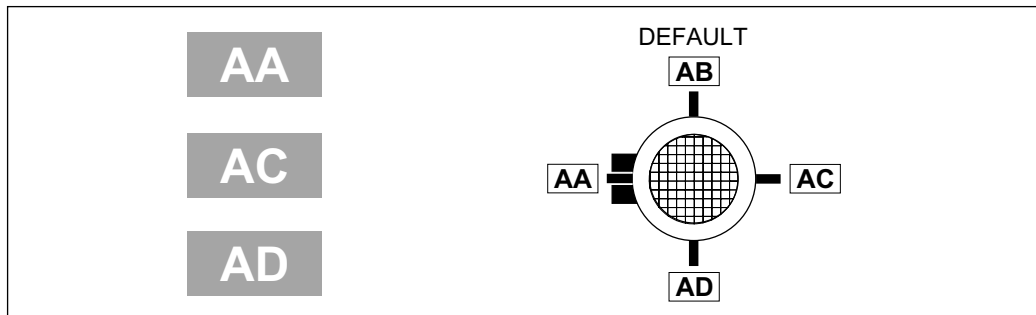
## Ausrichtung des Bremslülthebels

Bei beiden Optionen, **R** und **RM**, wird der Bremslülthebel, falls nicht anderweitig festgelegt, um 90° im Uhrzeigersinn zur Position des Klemmenkastens montiert (Position [AB] in der nachfolgenden Zeichnung). Andere Positionen: **AA** (0° zum Klemmenkasten), **AC** (180° zum Klemmenkasten) oder **AD** (270° zum Klemmenkasten, im Uhrzeigersinn vom Lüfter aus gesehen) können unter Angabe der entsprechenden Spezifikation bestellt werden:

## Orientation du levier de déblocage

*Pour les deux options **R** et **RM**, le levier de déblocage du frein est positionné, sauf spécification contraire, avec une orientation de 90° dans le sens des aiguilles d'une montre par rapport à la position de la boîte à bornes - référence [AB] sur le dessin ci-dessous.*

*Des orientations différentes, type **[AA]**, **[AC]** et **[AD]** peuvent être demandées à condition de préciser la position correspondante :*



## M24.2 - ALIMENTAZIONE SEPARATA DEL FRENO

### ...SA

La bobina del freno è alimentata da linea separata e indipendente dall'alimentazione del motore.

Il valore di tensione alla bobina deve essere specificato, es. 230SA.

L'opzione è applicabile ai motori con freno tipo FD, FA e BA.

## M24.2 - SEPARATE BRAKE SUPPLY

*The brake coil is directly fed through an independent line, separately from the motor.*

*In this case the rated voltage for the coil must be specified, e.g. 230SA.*

*The option is applicable to all motors with brake type FD, FA and BA.*

## M24.2 - BREMSE MIT SEPARATER SPANNUNGSVERSORGUNG

Die Bremsspule wird, unabhängig vom Motor, durch einen separaten Anschluss gespeist. In diesem Fall muss Betriebsspannung fuer die spule spezifiziert werden, z.b. 230SA.

Die Option ist verfuegbar für alle Motoren mit Bremstyp FD, FA und BA.

## M24.2 - ALIMENTATION FREIN SEPARÉE

*La bobine du frein est alimentée par une ligne séparée et indépendante de l'alimentation du moteur.*

*La valeur de tension à la bobine doit être spécifiée, ex. 230SA.*

*L'option est applicable aux moteurs avec frein type FD, FA et BA.*

### ...SD

La bobina del freno tipo FD è alimentata direttamente con corrente continua e l'alimentatore NON è fornito.

Il valore di tensione alla bobina deve essere specificato, es. 24SD.

*The brake coil is directly fed with DC current and the rectifier is out of the scope for supply.*

*The rated voltage for the coil must be specified, e.g. 24SD.*

Die Bremsspule wird direkt mit Gleichspannung gespeist. Der Gleichrichter ist nicht im Lieferumfang enthalten.

Die Betriebsspannung für die Spule muss spezifiziert werden, z.b. 24SD.

*La bobine du frein type FD est alimentée directement avec courant continu et l'alimentateur n'est pas fourni.*

*La valeur de tension à la bobine doit être spécifiée, es. 24SD.*

## M24.3 - FREQUENZA MASSIMA D'AVVIAMENTO

Nelle tabelle dei dati tecnici, per ogni tipo di freno, è indicata la massima frequenza di inserzione a vuoto  $Z_0$ , con intermittenza  $I = 50\%$ .

Questo valore definisce il nume-

## M24.3 - MAXIMUM STARTS PER HOUR

*For all types of Brakes the rating charts reports the maximum number of starts per hour under no-load conditions  $Z_0$  with cyclic duration factor  $I = 50\%$ .*

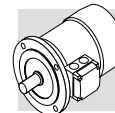
*This parameter gives the num-*

## M24.3 - MAX. SCHALTHÄUFIGKEIT

In den Tabellen, in denen die technischen Daten enthalten sind, wird für jeden Bremstyp die maximal Schalthäufigkeit im Leerbetrieb  $Z_0$  mit einer Einschaltdauer  $I = 50\%$  angegeben.

## M24.3 - FREQUENCE MAXIMUM DE DEMARRAGE

*Les tableaux des caractéristiques techniques indiquent, pour chaque type de frein, la fréquence maximum d'enclenchement à vide  $Z_0$ , avec intermittenza  $I = 50\%$ . Cette valeur dé-*



ro di avviamenti orari a vuoto che il motore può sopportare senza superare la temperatura ammessa dalla classe di isolamento F.

Nel caso pratico di motore accoppiato ad un carico esterno con potenza assorbita  $P_r$ , massa inerziale  $J_c$  e coppia resistente media durante l'avviamento  $M_L$ , il numero di avviamenti ammissibile si può calcolare con la seguente formula:

*ber of starts per hour under no-load conditions a motor can withstand without exceeding the temperature limit permitted for insulation class F.*

*Assuming an application involving an overhung load applied to the motor with absorbed power  $P_r$ , inertial mass  $J_c$  and starting mean load torque  $M_L$ , the number of starts allowed is calculated by the following formula:*

ben. Dieser Wert legt die Anzahl der Schaltungen im Leerbetrieb pro Stunde fest, denen der Motor standhalten kann, ohne dabei die von der Isolierstoffklasse F zulässige Temperatur zu überschreiten. Im praktischen Fall eines an eine externe Last gekoppelten Motors mit einer Leistungsaufnahme  $P_r$ , Trägheitsmasse  $J_c$  und einem durchschnittlichen Gegendrehmoment während des Anlaufs  $M_L$ , kann die Anzahl der zulässigen Schaltungen anhand der nachstehenden Formel berechnet werden:

*finì le nombre de démarrages horaires à vide que le moteur peut supporter sans dépasser la température admise par la classe d'isolation F.*

*Dans le cas pratique d'un moteur accouplé à une charge extérieure avec puissance absorbée  $P_r$ , masse inertielle  $J_c$  et couple résistant moyen durant le démarrage  $M_L$ , il est possible de calculer le nombre de démarrages admissibles avec la formule suivante :*

$$Z = \frac{Z_0 \cdot K_c \cdot K_d}{K_J}$$

dove:

$$K_J = \frac{J_m + J_c}{J_m} = \text{fattore di inerzia}$$

$$K_c = \frac{M_a - M_L}{M_a} = \text{fattore di coppia}$$

$K_d$  = fattore di carico vedi tabella:

where

$$K_J = \frac{J_m + J_c}{J_m} = \text{inertia factor}$$

$$K_c = \frac{M_a - M_L}{M_a} = \text{torque factor}$$

$K_d$  = load factor see table:

wobei gilt:

$$K_J = \frac{J_m + J_c}{J_m} = \text{Trägheitsfaktor}$$

$$K_c = \frac{M_a - M_L}{M_a} = \text{Drehmomentsfaktor}$$

$K_d$  = Lastfaktor siehe Tabelle:

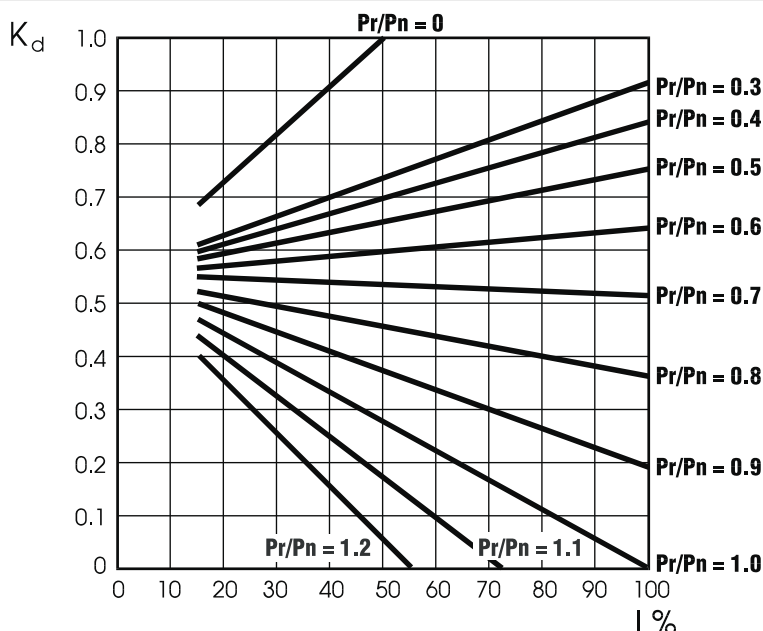
où

$$K_J = \frac{J_m + J_c}{J_m} = \text{facteur d'inertie}$$

$$K_c = \frac{M_a - M_L}{M_a} = \text{facteur de couple}$$

$K_d$  = facteur de charge voir tableau

(30)

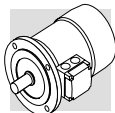


Con il numero di avviamenti così ottenuto si dovrà in seguito verificare che il massimo lavoro di frenatura sia compatibile con la capacità termica del freno  $W_{max}$ .

*The resulting number of starts must be double-checked against maximum braking effort, which must be compatible with brake thermal capacity  $W_{max}$ .*

Auf Grundlage der berechneten Anzahl der Schaltungen muss man prüfen, ob die maximale Bremsleistung mit der angegebenen thermischen Leistung der Bremse  $W_{max}$  übereinstimmt.

*Avec le nombre de démarrages ainsi obtenu, il est ensuite nécessaire de vérifier que l'action maximum de freinage est compatible avec la capacité thermique du frein  $W_{max}$ .*



## M24.4 - AVVIAMENTO PROGRESSIVO

## M24.4 - SOFT-START / STOP

## M24.4 - SANFTANLAUF / STOP

## M24.4 - DEMARRAGE/ARRET PROGRESSIF

### F1

Per applicazioni che richiedono progressività nelle fasi di avvio e di arresto è disponibile un volano – opzione **F1** – la cui inerzia aggiuntiva assorbe energia cinetica durante l'avviamento e la restituisce in frenatura, rendendo i transitori più progressivi e gradual.

Il volano è disponibile per i motori autofrenanti del tipo BN\_FD, con caratteristiche specifiche dettagliate nella tabella che segue:

*An optional flywheel – option **F1** – is available for applications requiring soft starting or stopping. The flywheel's added inertia uses up kinetic energy during starting and returns it back during braking, thus catering for more progressive and gradual shock loads.*

*The optional flywheel is available for brake motors type BN\_FD, with specific characteristics as detailed in the table below:*

Für Anwendungen, bei denen einer sanfte Anlauf- und Stop erforderlich ist, steht als – Option **F1** – ein Schwungrad zur Verfügung, dessen zusätzliches Trägheitsmoment während der Anlaufphase kinetische Energie aufnimmt, die in der Abbremsphase wieder abgegeben wird. Dadurch erfolgen die Übergangsphasen progressiver und sanfter. Das Schwungrad ist für die Bremsmotoren vom Typ BN\_FD in den nachstehend aufgeführten spezifischen Details verfügbar:

*Pour les applications nécessitant une progressivité au cours des phases de démarrage et d'arrêt, un volant – option **F1** – est disponible ; son inertie supplémentaire absorbe l'énergie cinétique durant le démarrage et la restitue au moment du freinage, rendant ainsi les phases transitoires plus progressives et graduelles: Le volant est disponible pour les moteurs frein du type BN\_FD, ses caractéristiques spécifiques détaillées sont indiquées dans le tableau suivant :*

(31)

| Volano per avviamento progressivo / Flywheel for soft starting / Schwungräder für Sanftanlauf<br>Volant pour démarrage/arret progressif |                                                                                     |                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| BN_FD                                                                                                                                   | Peso del volano<br>Flywheel weight<br>Gewicht Schwungrad<br>Poids du volant<br>[Kg] | Inerzia volano<br>Flywheel inertia<br>Trägheitsmoment des Schwungrad<br>Inertie du volant<br>J <sub>v</sub> [Kg m <sup>2</sup> ] |
| <b>BN 63</b>                                                                                                                            | 0.69                                                                                | 0.00063                                                                                                                          |
| <b>BN 71</b>                                                                                                                            | 1.13                                                                                | 0.00135                                                                                                                          |
| <b>BN 80</b>                                                                                                                            | 1.67                                                                                | 0.00270                                                                                                                          |
| <b>BN 90</b>                                                                                                                            | 2.51                                                                                | 0.00530                                                                                                                          |
| <b>BN 100</b>                                                                                                                           | 3.48                                                                                | 0.00840                                                                                                                          |
| <b>BN 112</b>                                                                                                                           | 4.82                                                                                | 0.01483                                                                                                                          |
| <b>BN 132</b>                                                                                                                           | 6.19                                                                                | 0.02580                                                                                                                          |

Per le esigenze di particolari applicazioni, ad es. traslazioni, che richiedano regolazioni micrometriche della coppia frenante è disponibile una serie di motori autofrenanti, denominata BN\_FM, dettagliata nel catalogo cod. 1134 R1, sviluppato per le motorizzazioni dei carriponte. Consultare per questo il Servizio Tecnico Bonfiglioli.

*For special applications that require a fine adjustment of braking torque, as is the case with track drives, a specific brake motor type BN\_FM is available. This type of product has been developed for bridge crane drives and is described in detail in catalogue no. 1134 R1. Please contact Bonfiglioli Engineering for more details.*

Für besondere Anwendungen, z.B. Transfers, die fein abgestufte Einstellungen des Bremsmoments erfordern, ist eine Reihe an Bremsmotoren verfügbar (BN\_FM) und die detailliert im Katalog Art.-Nr. 1134 R1 beschrieben werden. Dieser Katalog ist für die Antriebe von Laufkränen entwickelt wurde. Wenden Sie sich diesbezüglich bitte an unseren Technischen Kundendienst.

*En cas d'exigences d'applications particulières, par ex. translations, qui nécessitent des réglages micrométriques du couple de freinage, une série de moteurs frein est disponible, dénommée BN\_FM, détaillée dans le catalogue réf. 1134 R1, conçue pour les motorisations des ponts roulants. Dans ce cas, consulter le Service Bonfiglioli.*

## M24.5 - FILTRO CAPACITIVO

## M24.5 - CAPACITIVE FILTER

## M24.5 - KAPAZITIVER FILTER

## M24.5 - FILTRE CAPACITIF

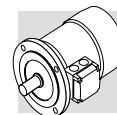
### CF

Per i soli motori autofrenanti in corrente continua, tipo BN\_FD, è disponibile in opzione il filtro capacitivo. Se corredati dell'opportuno filtro capacitivo a monte del raddrizzatore (opzione CF) i motori rientrano nei limiti di emissione previsti dalla Norma EN 50081-1 "Compatibilità elettromagnetica - Norma Generica sull'emissione - Parte 1: Ambienti residenziali, commerciali e dell'industria leggera".

*An optional capacitive filter is available for DC brake motors type BN\_FD only. When the suitable capacitive filter is installed upstream of the rectifier (option CF), motors comply with the emission limits required by standard EN 50081-1 "Electromagnetic Compatibility – Generic Emission Standard – Part 1: Residential, commercial and light industrial environment".*

Nur bei den Bremsmotoren mit Gleichstrombremse vom Typ BN\_FD, ist die Option eines kapazitiven Filters vorgesehen. Wird dieser Filter vor dem Gleichrichter (Option CF) installiert, fallen die Motoren in die von der Norm EN 50081-1 "Elektromagnetische Kompatibilität – Allgemeine Norm zur Emission – Teil 1: Wohngebiete, Handels- und Leichtinduszriezonen" vorgegebenen Emissionsgrenzen.

*Un filtre capacitif en option est disponible uniquement pour les moteurs frein en courant continu type BN\_FD. S'ils sont équipés du filtre capacitif approprié en amont du redresseur (option CF), les moteurs rentrent dans les limites d'émission prévues par la Norme EN 50081-1 "Compatibilité électromagnétique - Norme Générique sur l'émission - Partie 1: Milieux résidentiels, commerciaux et de l'industrie légère".*



**M25 - MOTORI  
AUTOFRENANTI  
IN C.C., TIPO BN\_FD**

- **Grandezze:** BN 63 ... BN200L

**M25 - DC BRAKE MOTORS  
TYPE BN\_FD**

- **Frame sizes:** BN 63 ... BN200L

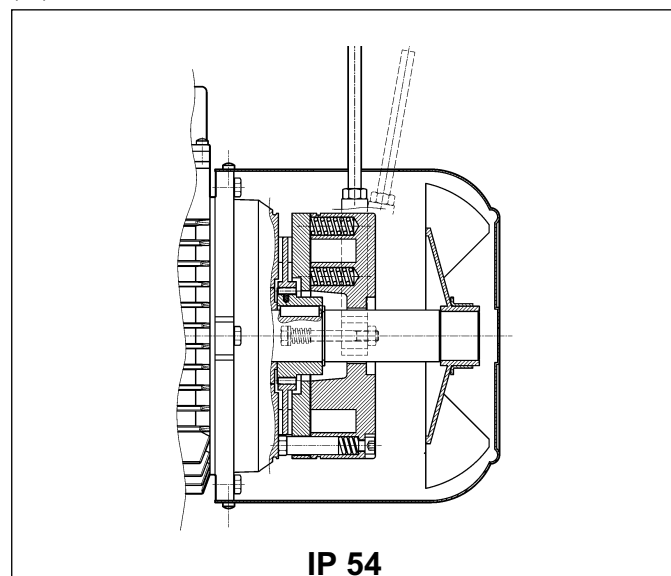
**M25 - WECHSELSTROMBREMS-  
MOTOREN MIT G.S.-  
BREMSE TYP BN\_FD**

- **Baugrößen:** BN 63 ... BN 200L

**M25 - MOTEURS FREIN EN  
C.C., TYPE BN\_FD**

- **Tailles :** BN 63 ... BN200L

(32)



**IP 54**

Freno elettromagnetico con bobina toroidale in corrente continua fissato con viti allo scudo motore; le molle di precarico realizzano il posizionamento assiale del corpo magnete. Il disco freno è scorrevole sul mozzo trascinatore in acciaio calettato sull'albero e previsto di molla antivibrazione. I motori sono forniti con freno tarato in fabbrica al valore di coppia riportato nelle tabelle dati tecnici; la coppia frenante può essere regolata modificando il tipo e/o il numero delle molle. A richiesta, i motori possono essere previsti di leva per lo sblocco manuale con ritorno automatico (R) o con mantenimento della posizione di rilascio freno (RM); per la posizione angolare della leva di sblocco vedi descrizione della relativa variante alla pag. 248. Il freno FD garantisce elevate prestazioni dinamiche e bassa rumorosità; le caratteristiche d'intervento del freno in corrente continua possono essere ottimizzate in funzione dell'applicazione, utilizzando i vari tipi di alimentatore disponibili e/o realizzando l'opportuno cablaggio.

*Direct current toroidal-coil electromagnetic brake bolted onto motor shield. Preloading springs provide axial positioning of magnet body.*

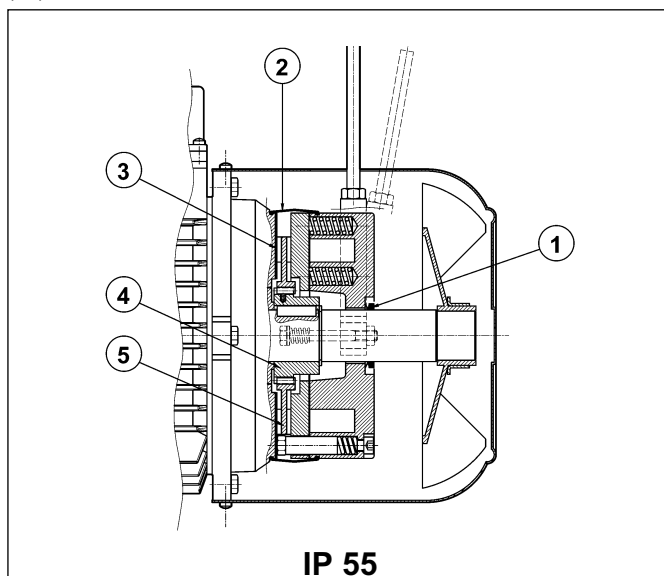
*Brake disc slides axially on steel hub shrunk onto motor shaft with anti-vibration spring. Brake torque factory setting is indicated in the corresponding motor rating charts. Braking torque may be modified by changing the type and/or number of springs.*

*At request, motors may be equipped with manual release lever with automatic return (R) or system for holding brake in the released position (RM).*

*See variant at page 248 for available release lever locations.*

*FD brakes ensure excellent dynamic performance with low noise. DC brake operating characteristics may be optimized to meet application requirements by choosing from the various rectifier/power supply and wiring connection options available.*

(33)

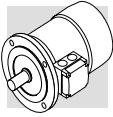


**IP 55**

Elektromagnetische Bremse mit Ringwicklungsspule für Gleichstromspannung, die mittels Schrauben am hinteren Motorschild befestigt ist. Die Federn sorgen für die axiale Ausrichtung des Magnetkörpers. Die Bremscheibe gleitet axial auf der Mitnehmermabe aus Stahl, die über eine Paßfeder mit der Motorwelle verbunden und mit einer Schwingungsdämpfung ausgestattet ist. Die Motoren werden vom Hersteller auf den in der Tabelle der technischen Daten angegebenen Bremsmoment eingestellt; das Bremsmoment kann durch das Ändern des Typs und/oder der Anzahl der Federn reguliert werden. Auf Anfrage können die Motoren mit einem Bremslüfthebel für die manuelle Lüftung der Bremse mit selbstständiger Rückstellung (R) ohne Arretierung oder mit arretierbarem Lüfthebel (RM) geliefert werden. Die Festlegung der Position des Bremslüfthebel in Abhängigkeit von der Klemmkastenlage erfolgt durch die Option auf Seite 248.

Die Bremse vom Typ FD garantiert hohe dynamische Leistungen und niedrige Laufgeräusche. Die Ansprechigenschaften der Bremse unter Gleichstrom können in Abhängigkeit zur jeweiligen Anwendung durch den Einsatz der verschiedenen verfügbaren Gleichrichter oder durch eine entsprechenden Anschluß der Bremse optimiert werden.

*Frein électromagnétique avec bobine toroïdale en courant continu, fixé avec des vis au bouclier moteur ; les ressorts de précharge réalisent le positionnement axial de la bobine. Le disque frein coulisse de façon axiale sur le moyeu d'entraînement en acier calé sur l'arbre et doté de ressort antivibration. Les moteurs sont fournis avec frein pré réglé en usine à la valeur de couple indiquée dans les tableaux des caractéristiques techniques ; le couple de freinage peut être réglé en modifiant le type et/ou le nombre de ressorts. Sur demande, les moteurs peuvent être équipés de levier pour le déblocage manuel avec retour automatique (R) ou avec maintien de la position de déblocage frein (RM); pour la position angulaire du levier de déblocage, voir description de la variante correspondante à la page 248. Le frein FD garantit des performances dynamiques élevées et un faible niveau de bruit ; les caractéristiques d'intervention du frein en courant continu peuvent être optimisées en fonction de l'application en utilisant les différents types de dispositifs d'alimentation disponibles et/ou en réalisant un câblage approprié.*



#### - Grado di protezione

L'esecuzione standard prevede il grado di protezione IP54. In opzione il motore autofrenante tipo FD viene fornito con grado di protezione **IP 55**, prevedendo le seguenti varianti costruttive:

- ① anello V-ring posizionato sull'albero motore N.D.E.
- ② fascia di protezione in gomma
- ③ anello in acciaio inox interposto tra scudo motore e disco freno
- ④ mozzo trascinatore in acciaio inox
- ⑤ disco freno in acciaio inox

#### - Degree of protection

Standard protection is IP54. Brake motor FD is also available in protection **IP 55**, which mandates the following variants:

- ① V-ring at N.D.E. of motor shaft
- ② dust and water-proof rubber boot
- ③ stainless steel ring placed between motor shield and brake disc
- ④ stainless steel hub
- ⑤ stainless steel brake disc

#### - Schutzart

Die Standardausführung ist Schutzart IP54 vor. Optional kann der Bremsmotor vom Typ FD in der Schutzart **IP 55** geliefert werden, wobei sind folgende Komponenten eingesetzt werden:

- ① V-Ring an der Motorwelle N.D.E.
- ② Schutzring aus Gummi
- ③ Ring aus rostfreiem Stahl zwischen Motorschild und Bremsscheibe
- ④ Mitnehmernabe aus rostfreiem Stahl
- ⑤ Bremsscheibe aus rostfreiem Stahl

#### - Degré de protection

L'exécution standard prévoit le degré de protection IP54. En option, le moteur frein type FD est fourni avec degré de protection IP 55, en prévoyant les variantes de construction suivantes :

- ① bague V-ring positionnées sur l'arbre moteur N.D.E.
- ② bande de protection en caoutchouc
- ③ bague en acier inox interposée entre le bouclier moteur et le disque de frein
- ④ moyeu d'entraînement en acier inox
- ⑤ disque frein en acier inox

#### - Alimentazione freno FD

L'alimentazione della bobina freno in c.c. è prevista per mezzo di opportuno raddrizzatore montato all'interno della scatola coprimorsetti e già cablato alla bobina del freno. Per motori a singola polarità è inoltre previsto di serie il collegamento del raddrizzatore alla morsettiera motore. Indipendentemente dalla frequenza di rete, la tensione standard di alimentazione del raddrizzatore  $V_B$  ha il valore indicato nella tabella qui di seguito:

#### - FD brake power supply

A rectifier accommodated inside the terminal box feeds the DC brake coil. Wiring- connection across rectifier and brake coil is performed at the factory. On all single-pole motors, rectifier is connected to the motor terminal board. Rectifier standard power supply voltage  $V_B$  is as indicated in the following table, regardless of mains frequency:

#### - Spannungsversorgung der Bremse FD

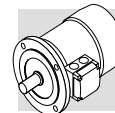
Die Versorgung der Gleichstrombremspule erfolgt über einen Gleichrichter im Klemmenkasten der bei Lieferung, wenn nicht anders bestellt, bereits mit der Bremspule verkauft ist. Bei den einpoligen Motoren ist serienmäßig der Anschluss des Gleichrichters an die Motorspannung vorgesehen. Unabhängig von der Netzfrequenz erfolgt die Versorgung des Gleichrichters  $V_B$  über die in der nachstehenden Tabelle angegebenen Standardspannung:

#### - Alimentation frein FD

L'alimentation de la bobine de frein en c.c. est prévue au moyen d'un redresseur approprié monté à l'intérieur de la boîte à bornes et déjà câblé à la bobine de frein. De plus, pour les moteurs à simple polarité, le raccordement du redresseur au bornier moteur est prévu de série. Indépendamment de la fréquence du réseau, la tension standard d'alimentation du redresseur  $V_B$  correspond à la valeur indiquée dans le tableau ci-dessous :

(34)

| 2, 4, 6 P                                                                           |                           |                       | 1 speed                                                                                                                                                                    |                                                                                                |
|-------------------------------------------------------------------------------------|---------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
|  | <b>BN_FD</b>              |                       | alimentazione freno da morsettiera<br>brake connected to terminal board power supply<br>Bremsversorgung über die Motorspannung<br>Alimentation frein depuis boîte à bornes | alimentazione separata<br>separate power supply<br>Separate Versorgung<br>Alimentation séparée |
|                                                                                     | $V_{mot} \pm 10\%$<br>3 ~ | $V_B \pm 10\%$<br>1 ~ |                                                                                                                                                                            |                                                                                                |
|                                                                                     | BN 63...BN 132            | 230/400 V – 50 Hz     | 230 V                                                                                                                                                                      | standard                                                                                       |
|                                                                                     | BN 160...BN 200           | 400/690 V – 50 Hz     | 400 V                                                                                                                                                                      | standard                                                                                       |



Per i motori a doppia polarità l'alimentazione standard del freno è da linea separata con tensione d'ingresso al raddrizzatore  $V_B$  come indicato in tabella:

*Switch-pole motors feature a separate power supply line for the brake with rectifier input voltage  $V_B$  as indicated in the table:*

Die polumschaltbaren Motoren müssen immer mit separater Bremsversorgungsspannung betrieben werden, deshalb erfolgt die Lieferung standardmäßig ohne Anschluß der Bremse an die Motorspannung, da diese mit einer am Eingang des Gleichrichters  $V_B$  anliegenden Spannung versorgt werden muß, entsprechend Werte in der nachstehenden Tabelle:

*Pour les moteurs à double polarité, l'alimentation standard du frein dérive d'une ligne séparée avec tension d'entrée  $V_B$  comme indiqué dans le tableau :*

(35)

| 2/4, 2/6, 2/8, 2/12, 4/6, 4/8 P                                                   |                           |                       | 2 speed                                                                                                                                                      |                                                                                                                                     |
|-----------------------------------------------------------------------------------|---------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
|  | BN_FD                     |                       | alimentazione freno da morsettiera<br>brake powered via terminal board<br>Bremsversorgung über die Motorspannung<br>Alimentation frein depuis boîte à bornes | alimentazione separata<br>separate power supply<br>Separate Versorgung<br>Alimentation séparée                                      |
|                                                                                   | $V_{mot} \pm 10\%$<br>3 ~ | $V_B \pm 10\%$<br>1 ~ |                                                                                                                                                              |                                                                                                                                     |
| BN 63...BN 132                                                                    | 400 V – 50 Hz             | 230 V                 |                                                                             | specificare $V_B$ SA o $V_B$ SD<br>specify $V_B$ SA or $V_B$ SD<br>$V_B$ SA oder $V_B$ SD angeben<br>spécifier $V_B$ SA ou $V_B$ SD |

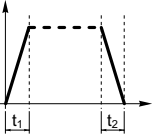
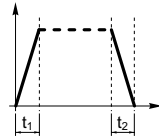
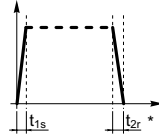
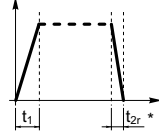
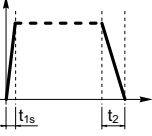
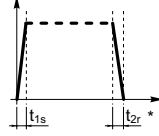
Il raddrizzatore è del tipo a diodi a semionda ( $V_{c.c} \approx 0,45 \times V_{c.a.}$ ) ed è disponibile nelle versioni **NB**, **SB**, **NBR** e **SBR**, come dettagliato nella tabella seguente:

*The diode half-wave rectifier ( $V_{DC} \approx 0,45 \times V_{AC}$ ) is available in versions **NB**, **SB**, **NBR** e **SBR**, as detailed in the table below:*

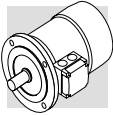
Bei dem Gleichrichter handelt es sich um einen Typ mit Halbwellendioden ( $V_{c.c} \approx 0,45 V_{c.a.}$ ). Er ist in den Versionen **NB**, **SB**, **NBR** und **SBR**, gemäß den Details in der nachstehenden Tabelle, verfügbar:

*Le redresseur est du type à diodes à demi-onde ( $V_{c.c} \approx 0,45 \times V_{c.a.}$ ) et il est disponible dans les versions **NB**, **SB**, **NBR** et **SBR**, comme indiqué de façon détaillée dans le tableau suivant :*

(36)

|  | Freno<br>Brake<br>Bremse<br>Ffrein | Raddrizzatore / Rectifier<br>Gleichrichter / Redresseur                                           |                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                     |                                    | standard                                                                                          | A richiesta / At request<br>Auf Anfrage / Sur demande                                                                                                                                                                                                                                                            |
| BN 63                                                                               | FD 02                              | <b>NB</b><br> | <b>SB</b><br><br><b>SBR</b><br><br><b>NBR</b><br> |
| BN 71                                                                               | FD 03                              |                                                                                                   |                                                                                                                                                                                                                                                                                                                  |
|                                                                                     | FD 53                              |                                                                                                   |                                                                                                                                                                                                                                                                                                                  |
| BN 80                                                                               | FD 04                              |                                                                                                   |                                                                                                                                                                                                                                                                                                                  |
| BN 90S                                                                              | FD 14                              |                                                                                                   |                                                                                                                                                                                                                                                                                                                  |
| BN 90L                                                                              | FD 05                              |                                                                                                   |                                                                                                                                                                                                                                                                                                                  |
| BN 100                                                                              | FD 15                              | <b>SB</b><br> | <b>SBR</b><br>                                                                                                                                                                                                              |
| BN 112                                                                              | FD 06S                             |                                                                                                   |                                                                                                                                                                                                                                                                                                                  |
| BN 132 - 160MR                                                                      | FD 56                              |                                                                                                   |                                                                                                                                                                                                                                                                                                                  |
|                                                                                     | FD 06                              |                                                                                                   |                                                                                                                                                                                                                                                                                                                  |
|                                                                                     | FD 07                              |                                                                                                   |                                                                                                                                                                                                                                                                                                                  |
| BN 160L - BN 180M                                                                   | FD 08                              |                                                                                                   |                                                                                                                                                                                                                                                                                                                  |
| BN 180L - BN 200M                                                                   | FD 09                              |                                                                                                   |                                                                                                                                                                                                                                                                                                                  |

(\*)  $t_{2c} < t_{2r} < t_2$



I raddrizzatore **SB** a controllo elettronico dell'eccitazione, riduce i tempi di sblocco del freno sovraccitando l'elettromagnete nei primi istanti d'inserzione, per passare poi al normale funzionamento a semionda a distacco del freno avvenuto.

L'impiego del raddrizzatore tipo **SB** è sempre da prevedere nei casi di:

- elevato numero di interventi orari
- tempi di sblocco freno ridotti
- elevate sollecitazioni termiche del freno.

Per applicazioni dove è richiesto un rapido rilascio del freno sono disponibili a richiesta i raddrizzatori **NBR** o **SBR**.

Questi raddrizzatori completano i tipi **NB** e **SB**, integrando nel circuito elettronico un interruttore statico che interviene diseccitando rapidamente il freno in caso di mancanza di tensione.

Questa soluzione consente di ridurre i tempi di rilascio del freno evitando ulteriori cablaggi e contatti esterni.

Per il migliore utilizzo dei raddrizzatori **NBR** e **SBR** è richiesta l'alimentazione separata del freno.

Tensioni disponibili: 230V  $\pm$  10%, 400V  $\pm$  10%, 50/60 Hz.

*Rectifier **SB** with electronic energizing control over-energizes the electromagnet upon power-up to cut brake release response time and then switches to normal half-wave operation once the brake has been released.*

*Use of the **SB** rectifier is mandatory in the event of:*

- *high number of operations per hour*
- *reduced brake release response time*
- *brake is exposed to extreme thermal stress.*

*Rectifiers **NBR** or **SBR** are available for applications requiring quick brake release response.*

*These rectifiers complement the **NB** and **SB** types as their electronic circuit incorporates a static switch that de-energizes the brake quickly in the event voltage is missing.*

*This arrangement ensures short brake release response time with no need for additional external wiring and contacts.*

*Optimum performance of rectifiers **NBR** and **SBR** is achieved with separate brake power supply.*

*Available voltages: 230V  $\pm$  10%, 400V  $\pm$  10%, 50/60 Hz.*

Der Gleichrichter **SB** mit elektronischer Kontrolle der Erregung reduziert die Bremslösezeiten, indem er die Bremsspule in den ersten Momenten der Einschaltung übermäßig erregt, um dann, nach erfolgter Bremslösung, in die normale Halbwellenfunktion umzuschalten.

Der Einsatz eines Gleichrichters vom Typ **SB** wird in folgenden Fällen empfohlen:

- hohe Anzahl von Schaltungen pro Stunde
- schnelle Bremsansprechzeiten
- starke thermische Beanspruchungen der Bremse.

Für die Anwendungen, bei denen eine schnelle Ansprechzeit der Bremse gefordert wird, können auf Anfrage die Gleichrichter **NBR** oder **SBR** geliefert werden. Diese Gleichrichter erweitern die Funktion der Typen **NB** und **SB**, indem in dem elektronischen Schaltkreis ein statischen Schalter integriert ist, durch dessen Auslösen die Bremse im Fall eines Spannungsausfalls schnell abgeregt wird. Diese Lösung ermöglicht eine Verringerung der Ansprechzeiten der Bremse, wodurch weitere Schaltungen und externe Sensoren vermieden werden können. Im Hinblick auf einen besseren Einsatz der Gleichrichter **NBR** und **SBR** ist bei der Bremse eine separate Versorgung erforderlich. Verfügbare Spannungen: 230V  $\pm$  10%, 400V  $\pm$  10%, 50/60 Hz.

*Le redresseur **SB** à contrôle électronique de l'excitation réduit les temps de déblocage du frein en surexcitant l'électro-aimant durant les premiers instants d'enclenchement pour passer ensuite au fonctionnement normal à demi-onde une fois le frein désactivé.*

*L'utilisation du redresseur type **SB** doit toujours être prévue dans les cas suivants:*

- *nombre d'interventions horaires élevé*
- *temps de déblocage frein réduits*
- *sollicitations thermiques du frein élevées.*

*Pour les applications nécessitant un déblocage rapide du frein, sur demande les redresseurs **NBR** ou **SBR** sont disponibles.*

*Ces redresseurs complètent les types **NB** et **SB**, en intégrant dans le circuit électronique un interrupteur statique qui intervient en désexcitant rapidement le frein en cas de coupure de tension.*

*Cette solution permet de réduire les temps de déblocage du frein en évitant d'autres câblages et contacts extérieurs. Pour une meilleure utilisation des redresseurs **NBR** et **SBR** l'alimentation séparée du frein est nécessaire.*

*Tensions disponibles : 230V  $\pm$  10%, 400V  $\pm$  10%, 50/60 Hz.*

#### - Dati tecnici freni FD

Nella tabella sottostante sono riportati i dati tecnici dei freni in c.c. tipo FD.

#### - FD brake technical specifications

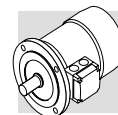
*The table below reports the technical specifications of DC brakes FD.*

#### - Technische Daten - Bremstyp FD

In der nachstehenden Tabelle werden die technischen Daten der Gleichstrombremsen vom Typ FD angegeben.

#### - Caractéristiques techniques freins FD

*Le tableau suivant indique les caractéristiques techniques des freins en c.c. type FD.*



(37)

| Freno<br>Brake<br>Bremse<br>Frein | Coppia frenante $M_b$<br>Brake torque $M_b$<br>Bremsmoment $M_b$<br>Couple de freinage $M_b$ [Nm]<br>n° molle / no. of springs<br>Feder / ressorts |     |      | Rilascio<br>Release<br>Ansprechzeit<br>Déblocage |               | Frenatura<br>Braking<br>Bremszeit<br>Freinage |               | Wmax per frenata<br>Wmax per brake operation<br>Wmax pro Bremsung<br>Wmax par freinage<br>[J] |         |          | W    | P   |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|--------------------------------------------------|---------------|-----------------------------------------------|---------------|-----------------------------------------------------------------------------------------------|---------|----------|------|-----|
|                                   | 6                                                                                                                                                  | 4   | 2    | $t_1$ [ms]                                       | $t_{1s}$ [ms] | $t_2$ [ms]                                    | $t_{2c}$ [ms] | 10 c/h                                                                                        | 100 c/h | 1000 c/h | [MJ] | [W] |
|                                   |                                                                                                                                                    |     |      |                                                  |               |                                               |               |                                                                                               |         |          |      |     |
| <b>FD 02</b>                      | —                                                                                                                                                  | 3.5 | 1.75 | 30                                               | 15            | 80                                            | 9             | 4500                                                                                          | 1400    | 180      | 15   | 17  |
| <b>FD 03</b>                      | 5                                                                                                                                                  | 3.5 | 1.75 | 50                                               | 20            | 100                                           | 12            | 7000                                                                                          | 1900    | 230      | 25   | 24  |
| <b>FD 53</b>                      | 7.5                                                                                                                                                | 5   | 2.5  | 60                                               | 30            | 100                                           | 12            |                                                                                               |         |          |      |     |
| <b>FD 04</b>                      | 15                                                                                                                                                 | 10  | 5    | 80                                               | 35            | 140                                           | 15            | 10000                                                                                         | 3100    | 350      | 30   | 33  |
| <b>FD 14</b>                      |                                                                                                                                                    |     |      |                                                  |               |                                               |               |                                                                                               |         |          |      |     |
| <b>FD 05</b>                      | 40                                                                                                                                                 | 26  | 13   | 150                                              | 65            | 170                                           | 20            |                                                                                               |         |          |      |     |
| <b>FD 15</b>                      | 40                                                                                                                                                 | 26  | 13   | 150                                              | 65            | 170                                           | 20            | 18000                                                                                         | 4500    | 500      | 50   | 45  |
| <b>FD 55</b>                      | 55                                                                                                                                                 | 37  | 18   | —                                                | 65            | 170                                           | 20            |                                                                                               |         |          |      |     |
| <b>FD 06S</b>                     | 60                                                                                                                                                 | 40  | 20   | —                                                | 80            | 220                                           | 25            | 20000                                                                                         | 4800    | 550      | 70   | 55  |
| <b>FD 56</b>                      | —                                                                                                                                                  | 75  | 37   | —                                                | 90            | 150                                           | 20            | 29000                                                                                         | 7400    | 800      | 80   | 65  |
| <b>FD 06</b>                      | —                                                                                                                                                  | 100 | 50   | —                                                | 100           | 150                                           | 20            |                                                                                               |         |          |      |     |
| <b>FD 07</b>                      | 150                                                                                                                                                | 100 | 50   | —                                                | 120           | 200                                           | 25            | 40000                                                                                         | 9300    | 1000     | 130  | 65  |
| <b>FD 08 *</b>                    | 250                                                                                                                                                | 200 | 170  | —                                                | 140           | 350                                           | 30            | 60000                                                                                         | 14000   | 1500     | 230  | 100 |
| <b>FD 09 **</b>                   | 400                                                                                                                                                | 300 | 200  | —                                                | 200           | 450                                           | 40            | 70000                                                                                         | 15000   | 1700     | 230  | 120 |

\* valori di coppia frenante ottenuti con n° 9,7,6 molle rispettivamente

\* brake torque values obtained with 9, 7 and 6 springs, respectively

\* Werte, der durch den Einsatz von jeweils 9, 7, 6 Federn erreichten Bremsmomente

\* valeurs de couple de freinage obtenues respectivement avec n° 9, 7, 6 ressorts

\*\* valori di coppia frenante ottenuti con n° 12,9,6 molle rispettivamente

\*\* brake torque values obtained with 12, 9 and 6 springs, respectively

\*\* Werte, der durch den Einsatz von jeweils 12, 9, 6 Federn erreichten Bremsmomente

\*\* valeurs de couple de freinage obtenues respectivement avec n° 12, 9, 6 ressorts

#### Legenda:

$t_1$  = tempo di rilascio del freno con alimentatore a semionda  
 $t_{1s}$  = tempo di rilascio del freno con alimentatore con sovraeccitazione  
 $t_2$  = ritardo di frenatura con interruzione lato c.a. e alimentazione separata  
 $t_{2c}$  = ritardo di frenatura con interruzione lato c.a. e c.c. I valori di  $t_1$ ,  $t_{1s}$ ,  $t_2$ ,  $t_{2c}$ , indicati nella tabella (37) sono riferiti al freno tarato alla coppia massima, traferro medio e tensione nominale.  
 $W_{max}$  = energia max per frenata  
 $W$  = energia di frenatura tra due regolazioni successive  
 $P_b$  = potenza assorbita dal freno a 20°C  
 $M_b$  = coppia frenante statica ( $\pm 15\%$ )  
 $c/h$  = avviamenti orari

#### Key:

$t_1$  = brake release time with half-wave rectifier  
 $t_{1s}$  = brake release time with over-energizing rectifier  
 $t_2$  = brake engagement time with AC line interruption and separate power supply  
 $t_{2c}$  = brake engagement time with AC and DC line interruption – Values for  $t_1$ ,  $t_{1s}$ ,  $t_2$ ,  $t_{2c}$  indicated in the tab. (37) are referred to brake set at maximum torque, medium air gap and rated voltage  
 $W_{max}$  = max energy per brake operation  
 $W$  = braking energy between two successive air gap adjustments  
 $P_b$  = brake power absorption at 20°C  
 $M_b$  = static braking torque ( $\pm 15\%$ )  
 $c/h$  = starts per hour

#### Legende:

$t_1$  = Ansprechzeit der Bremse mit Halbwellengleichrichter  
 $t_{1s}$  = Ansprechzeit der Bremse mit elektronisch gesteuerten Erregungsgleichrichter  
 $t_2$  = Bremsverzögerung mit Unterbrechung auf Wechselstromseite und Fremdversorgung  
 $t_{2c}$  = Bremsverzögerung mit Unterbrechung auf Wechselstrom- und Gleichstromseite – Die in der Tab. (37) angegebenen Werte  $t_1$ ,  $t_{1s}$ ,  $t_2$ ,  $t_{2c}$  beziehen sich auf eine auf das max. Bremsmoment geeichte Bremse, mit mittlerem Luftspalt und Nennspannung.  
 $W_{max}$  = max. Energie pro Bremsung  
 $W$  = Bremsenergie zwischen zwei Einstellungen des Luftspalts  
 $P_b$  = bei 20°C von der Bremse aufgenommene Leistung (50 Hz)  
 $M_b$  = statisches Bremsmoment ( $\pm 15\%$ )  
 $c/h$  = Schaltungen pro stunde

#### Légende:

$t_1$  = temps de déblocage du frein avec dispositif d'alimentation à demi-onde  
 $t_{1s}$  = temps de déblocage du frein avec dispositif d'alimentation à contrôle électronique de l'excitation  
 $t_2$  = retard de freinage avec interruption côté c.a. et alimentation séparée  
 $t_{2c}$  = retard de freinage avec interruption côté c.c. Les valeurs de  $t_1$ ,  $t_{1s}$ ,  $t_2$ ,  $t_{2c}$ , indiquées dans le tab. (37) se réfèrent au frein étalonné au couple maximal, entrefer moyen et tension nominale.  
 $W_{max}$  = énergie max. par freinage  
 $W$  = énergie de freinage entre deux réglages successifs de l'entrefer  
 $P_b$  = puissance absorbée par le frein à 20°C  
 $M_b$  = couple de freinage statique ( $\pm 15\%$ )  
 $c/h$  = démarrages horaires

#### - Collegamenti freno FD

I motori standard ad una velocità sono forniti con il collegamento del raddrizzatore alla morsettiera motore già realizzato in fabbrica.  
 Per motori a 2 velocità, e dove è richiesta l'alimentazione del freno separata, prevedere il collegamento al raddrizzatore in ac-

#### - FD brake connections

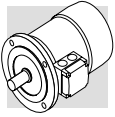
On standard single-pole motors, the rectifier is connected to the motor terminal board at the factory.  
 For switch-pole motors and where a separate brake power supply is required, connection to rectifier must comply with brake voltage  $V_B$  stated in mo-

#### - Anschlüsse - Bremstyp FD

Die einpoligen Motoren werden vom Werk ab mit an die Motorspannung angeschlossenem Gleichrichters geliefert. Für die polumschaltbaren Motoren, und Bremse mit separater Versorgung, wird in Übereinstimmung mit der auf dem Typenschild des Motors angegebenen Brems-

#### - Raccordements frein FD

Les moteurs standard à une vitesse sont fournis avec le raccordement du redresseur au bornier moteur déjà réalisé en usine.  
 Pour les moteurs à 2 vitesses, et lorsqu'une alimentation séparée du frein est requise, prévoir le raccordement au redresseur conformément à la tension



cordo alla tensione freno  $V_B$  indicata nella targhetta del motore.

**Data la natura induttiva del carico, per il comando del freno e per l'interruzione lato corrente continua devono essere utilizzati contatti con categoria d'impiego AC-3 secondo IEC 60947-4-1.**

Tabella (38) - Alimentazione freno dai morsetti motore ed interruzione lato a.c.

Tempo di arresto  $t_2$  ritardato e funzione delle costanti di tempo del motore.

Da prevedere quando sono richiesti avviamenti/arresti progressivi.

Tabella (39) - Bobina freno con alimentazione separata ed interruzione lato c.a.

Tempo di arresto normale ed indipendente dal motore.

Tabella (40) - Bobina freno con alimentazione dai morsetti motore ed interruzione lato c.a. e c.c.

Arresto rapido con i tempi d'intervento  $t_{2c}$ .

Tabella (41) - Bobina freno con alimentazione separata ed interruzione lato c.a. e c.c.

Tempo di arresto ridotto secondo i valori  $t_{2c}$ .

tor name plate.

**Because the load is of the inductive type, brake control and DC line interruption must use contacts from the usage class AC-3 to IEC 60947-4-1.**

Table (38) - Brake power supply from motor terminals and AC line interruption.

Delayed stop time  $t_2$  and function of motor time constants.

Mandatory when soft-start/stops are required.

Table (39) - Brake coil with separate power supply and AC line interruption

Normal stop time independent of motor.

Table (40) - Brake coil power supply from motor terminals and AC/DC line interruption.

Quick stop with operation times  $t_{2c}$ .

Table (41) - Brake coil with separate power supply and AC/DC line interruption.

Stop time decreases by values  $t_{2c}$ .

spannung  $V_B$  der Anschluss an den Gleichrichter vorgesehen.

**Da es sich bei der Bremsleistung um eine induktive Kraft handelt, müssen gemäß IEC 60947-4-1 für die Steuerung der Bremse und die Unterbrechung der Gleichstromseite Kontakte der Kategorie AC-3 verwendet werden.**

Tabelle (38) - Bremsversorgung über die Motorspannung und Unterbrechung der Wechselstromseite. Verzögerter und von den Zeitkonstanten des Motors abhängige Haltezeit  $t_2$ . Vorzusehen, wenn progressive Starts/Stops erforderlich sind.

Tabelle (39) - Bremsspule mit separater Spannungsversorgung und Unterbrechung der Wechselstromseite. Normale und vom Motor unabhängige Stoppzeiten.

Tabelle (40) - Bremsspule mit Versorgung über die Motorspannung und Unterbrechung der Gleich- und der Wechselstromseite. Schneller Stopp mit angegebenen Ansprechzeiten  $t_{2c}$ .

Tabelle (41) - Bremsspule mit separater Spannungsversorgung und Unterbrechung der Gleich- und der Wechselstromseite. Reduzierte Stoppzeiten angegebenen Werte  $t_{2c}$ .

frein  $V_B$  indiquée sur la plaque signalétique du moteur.

**Etant donné la nature inductive de la charge, pour la commande du frein et l'interruption côté courant continu, il est nécessaire d'utiliser des contacts avec catégorie d'utilisation AC-3 selon la norme IEC 60947-4-1.**

Tableau (38) - Alimentation frein depuis bornes moteur et interruption côté c.a.

Temps d'arrêt  $t_2$  retardé et fonction des constantes de temps du moteur.

A prévoir lorsque des démarrages/arrests progressifs sont requis.

Tableau (39) - Bobine de frein avec alimentation séparée et interrupteur côté c.a.

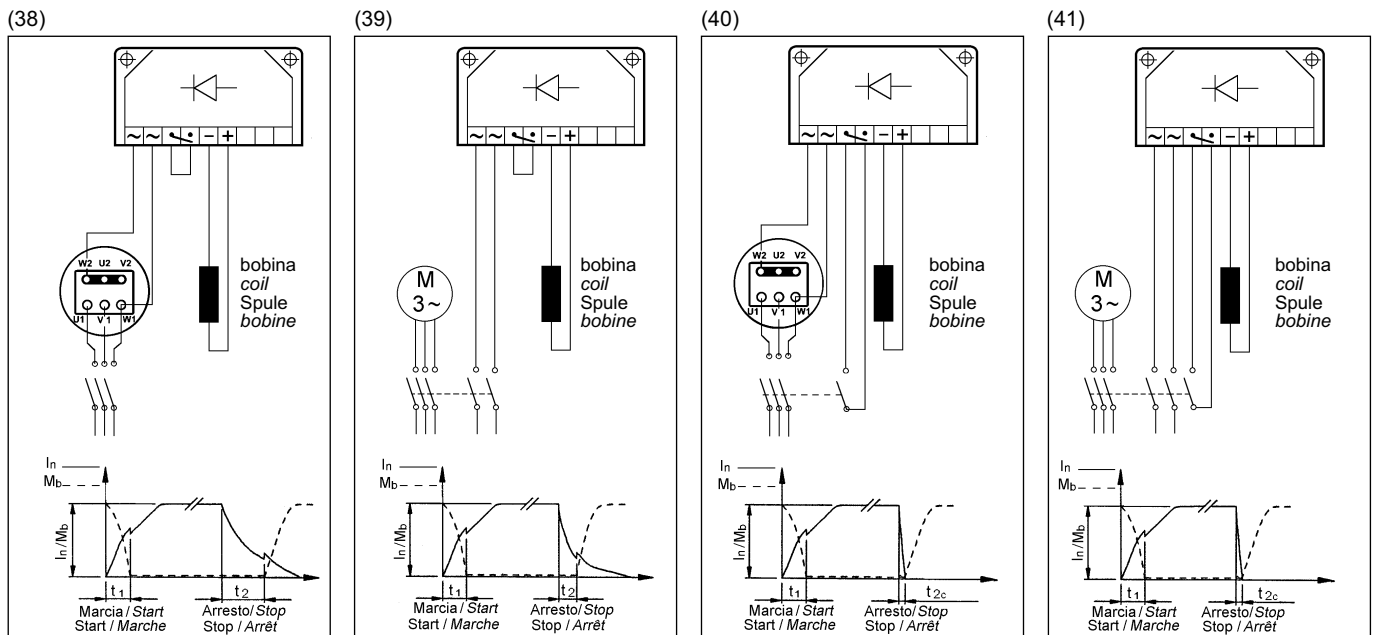
Temps d'arrêt normal et indépendant du moteur.

Tableau (40) - Bobine de frein avec alimentation depuis les bornes moteur et interruption côté c.a. et c.c.

Arrêt rapide avec les temps d'intervention  $t_{2c}$ .

Tableau (41) - Bobine de frein avec alimentation séparée et interruption côté c.a. et c.c.

Temps d'arrêt réduit selon les valeurs  $t_{2c}$ .

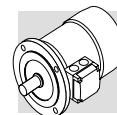


Le tabelle da (38) a (41) riportano gli schemi tipici di collegamento per alimentazione 400 V, motori 230/400V collegati a stella e freno 230 V.

Tables (38) through (41) show the typical connection diagrams for 400 V power supply, star-connected 230/400V motors and 230 V brake.

In den Tabellen (38) bis (41) werden die typischen Schaltungen für Versorgung mit 400 V, Motoren 230/400V mit Sternschaltung und einer Bremsspannung von 230 V wiedergegeben.

Les tableaux de (38) à (41) indiquent les schémas typiques de branchement pour une alimentation de 400 V, moteurs 230/400V raccordés en étoile et frein 230 V.



**M26 - MOTORI AUTOFRENANTI  
IN C.A. TIPO BN\_FA**

**M26 - AC BRAKE MOTORS  
TYPE BN\_FA**

**M26 - WECHSELSTROMBREMS-  
MOTOREN MIT W.S.-  
BREMSE TYP BN\_FA**

**M26 - MOTEURS FREIN  
EN C.A. TYPE BN\_FA**

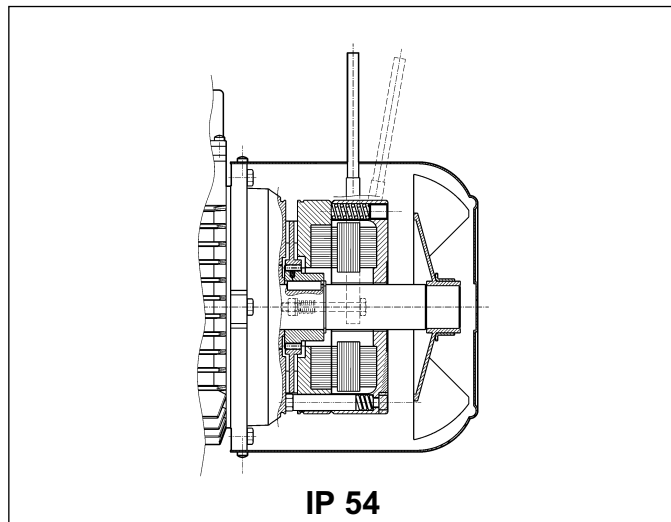
- **Grandezze:** BN 63 ... BN 180M

- **Frame sizes:** BN 63 ... BN 180M

- **Baugrößen:** BN 63 ... BN 180M

- **Tailles:** BN 63 ... BN 180M

(42)



**IP 54**

Freno elettromagnetico con alimentazione in **corrente alternata** trifase, fissato con viti allo scudo motore; le molle di precarico realizzano il posizionamento assiale del corpo magnete.

Il disco freno è scorrevole assialmente sul mozzo trascinatore in acciaio calettato sull'albero e previsto di molla antivibrazione.

La coppia frenante è preimpostata in fabbrica su valori che sono indicati nelle tabelle dati tecnici dei relativi motori.

L'azione del freno è inoltre modulabile, regolando con continuità la coppia frenante, tramite le viti che realizzano il precarico delle molle; il campo di regolazione della coppia è:  $30\% M_{bMAX} < M_b < M_{bMAX}$  ( $M_{bMAX}$  è il momento frenante max riportato in tab. (46).

Il freno tipo FA presenta dinamiche molto elevate che lo rendono idoneo in applicazioni dove sono richieste frequenze di avviamento elevate con tempi d'intervento molto rapidi.

A richiesta, i motori possono essere previsti di leva per lo sblocco manuale con ritorno automatico (R). Per la specifica della posizione angolare della leva vedi relativa variante alla pag. 250.

*Electromagnetic brake operates from three-phase **alternated current** power supply and is bolted onto conveyor shield. Preloading springs provide axial positioning of magnet body.*

*Steel brake disc slides axially on steel hub shrunk onto motor shaft with anti-vibration spring.*

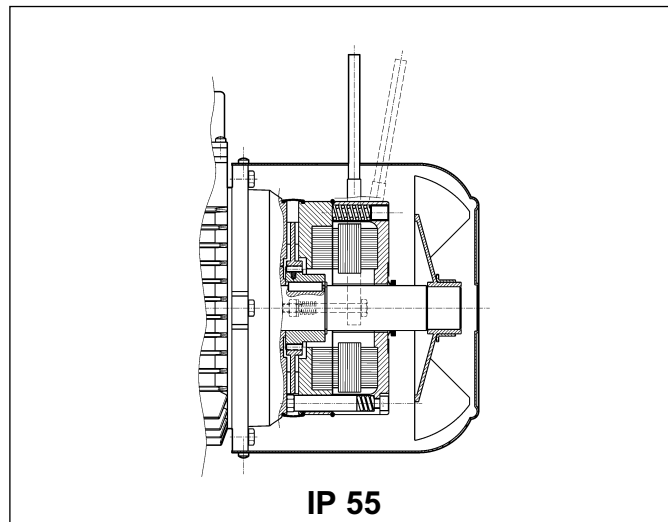
*Brake torque factory setting is indicated in the corresponding motor rating charts.*

*Spring preloading screws provide stepless braking torque adjustment. Torque adjustment range is  $30\% M_{bMAX} < M_b < M_{bMAX}$  (where  $M_{bMAX}$  is maximum braking torque as shown in tab. (46).*

*Thanks to their high dynamic characteristics, FA brakes are ideal for heavy-duty applications as well as applications requiring frequent stop/starts and very fast response time.*

*Motors may be equipped with manual release lever with automatic return (R) at request. See variants at page 250 for available lever locations.*

(43)



**IP 55**

Elektomagnetische Bremse mit **Drehstromversorgung**, die mittels Schrauben am hinteren Motorschild befestigt ist. Die Federn sorgen dabei für die axiale Ausrichtung des Magnetkörpers. Die Bremsscheibe (Stahl) gleitet axial auf dem sich auf dem Rotor befindlichen Mitnehmer, der über eine Paßfeder mit Motorwelle verbunden und mit einer Schwingungsdämpffeder ausgestattet ist. Das Bremsmoment wird auf das entsprechende Motor-

moment eingestellt (siehe Tabelle der technischen Daten der entsprechenden Motoren). Das Bremsmoment ist stufenlos durch über die Schrauben die die Federvorspannung einstellbar. Der Einstellbereich beträgt  $30\% M_{bMAX} < M_b < M_{bMAX}$  ( $M_{bMAX}$  steht für den max. Bremsmoment, der in der Tab (46) angegeben wird). Die Bremse vom Typ FA zeichnet sich durch ihre hohen Dynamik aus, weshalb sie für Anwendungen geeignet sind, in denen hohe Schaltfrequenzen und schnelle Ansprechzeiten gefordert werden. Auf Anfrage können die Motoren mit einem Lüfterhebel für die manuelle Lüftung der Bremse mit automatischer Rückstellung (R) geliefert werden. Die Angabe der Montageposition erfolgt über die Angabe der Option auf Seite 250.

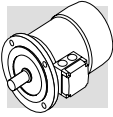
*Frein électromagnétique avec alimentation en **courant alternatif** triphasé, fixé avec des vis au bouclier ; les ressorts de précharge réalisent le positionnement axial de la bobine.*

*Le disque frein coulisse de façon axiale sur le moyeu d'entraînement en acier, calé sur l'arbre et doté de ressort antivibration.*

*Le couple de freinage est préréglé en usine aux valeurs qui sont indiquées dans les tableaux des caractéristiques techniques des moteurs correspondants. De plus, l'action du frein est modulable, en réglant le couple de freinage en continu au moyen des vis qui réalisent la précharge des ressorts ; la plage de réglage du couple est de  $30\% M_{bMAX} < M_b < M_{bMAX}$  ( $M_{bMAX}$  est le couple de freinage maximum indiqué dans le tab. (46).*

*Le frein type FA présente des caractéristiques dynamiques très élevées, il est donc adapté pour des applications nécessitant des fréquences de démarrage élevées et des temps d'intervention très rapides.*

*Sur demande, les moteurs peuvent être prévus avec levier pour le déblocage manuel avec retour automatique (R). Pour la spécification de la position angulaire du levier, voir variante page 250.*



#### - Grado di protezione

L'esecuzione standard prevede il grado di protezione IP54.

In opzione, il motore autofrenante BN\_FA viene fornito con grado di protezione **IP 55** prevedendo le seguenti varianti costruttive:

- anello V-ring posizionato sull'albero motore N.D.E.
- fascia di protezione in gomma
- anello o-ring

#### - Degree of protection

Standard protection is IP54.

Brake motor BN\_FA is also available in protection **IP 55**, which mandates the following variants:

- V-ring at N.D.E. of motor shaft
- rubber boot
- O-ring

#### - Schutzart

Die Standardausführung ist Schutzart IP54 vor.

Optional kann der Bremsmotor BN\_FA auch in der Schutzart IP 55 geliefert werden, was durch die folgenden zusätzlichen Bauteile erreicht wird:

- V-Ring an der Motorwelle N.D.E.
- Schutzring aus Gummi
- O-Ring

#### - Degré de protection

L'exécution standard prévoit le degré de protection IP54.

En option, le moteur frein BN\_FA est fourni avec degré de protection **IP 55**, les variations de construction suivantes sont prévues :

- bague V-ring positionné sur l'arbre moteur N.D.E.
- bande de protection en caoutchouc
- joint torique

#### - Alimentazione freno FA

Nei motori a singola polarità l'alimentazione della bobina freno è derivata direttamente dalla morsettiera motore e la tensione del freno quindi coincide con la tensione del motore. In questo caso la tensione del freno può essere omessa dalla designazione.

Per i motori a doppia polarità, e per i motori con alimentazione separata del freno, è presente una morsettiera ausiliaria con 6 terminali per il collegamento alla linea del freno. In entrambi i casi il valore di tensione del freno dovrà essere specificato in designazione.

Nella tabella seguente sono riportate le condizioni di alimentazione standard del freno in c.a. per i motori a singola e doppia polarità:

#### - FA brake power supply

In single-pole motors, power supply is brought to the brake coil direct from the motor terminal box. As a result, brake voltage and motor voltage are the same. In this case, brake voltage indication may be omitted in the designation.

Switch-pole motors and motors with separate brake power supply feature an auxiliary terminal board with 6 terminals for connection to brake line. In both cases, brake voltage indication in the designation is mandatory. The following table reports standard AC brake power supply ratings for single- and switch-pole motors:

#### - Stromversorgung - Bremstyp FA

Bei den einpoligen Motoren wird die Versorgung der Bremsspule direkt vom Motorklemmenkasten abgenommen, das bedeutet, dass die Spannung der Bremse mit der Motorspannung übereinstimmt. In diesem Fall braucht die Bremsenspannung nicht extra angegeben werden.

Für die polumschaltbaren Motoren und für eine separate Bremsversorgung ist eine Hilfsklemmenleiste mit 6 Anschlüssen vorgesehen, die einen Anschluß der Bremse ermöglichen. In beiden Fällen muss die Bremsspannung in der Bestellung angegeben werden.

In der nachstehenden Tabelle werden für die einpoligen und die polumschaltbaren Motoren die Standardspannungen der Wechselstrombremsen angegeben:

#### - Alimentation frein FA

Sur les moteurs à simple polarité, l'alimentation de la bobine frein dérive directement du bornier moteur, par conséquent, la tension du frein coïncide avec la tension du moteur. Dans ce cas, la tension du frein peut être omise de la désignation.

Pour les moteurs à double polarité et les moteurs avec alimentation séparée du frein, une boîte à bornes auxiliaire avec 6 bornes pour le raccordement à la ligne du frein, est présente. Dans les deux cas, la valeur de tension du frein doit être spécifiée dans la désignation.

Le tableau suivant indique les conditions d'alimentation standard du frein en c.a. pour les moteurs à simple et double polarité :

(44)

| Motori a singola polarità<br>Single-speed motors<br>Einpolige Motoren<br>Moteurs à simple polarité | BN 63 ... BN 132           | BN 160 ... BN 180 M        |
|----------------------------------------------------------------------------------------------------|----------------------------|----------------------------|
|                                                                                                    | 230Δ / 400Y V ±10% – 50 Hz | 400Δ / 690Y V ±10% – 50 Hz |
|                                                                                                    | 265Δ / 460Y V ±10% - 60 Hz | 460Δ V – 60 Hz             |

(45)

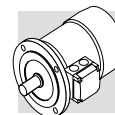
| Motori a doppia polarità (alimentazione da linea separata)<br>Switch-speed motors (separate power supply line)<br>Polumschaltbare Motoren (separate Versorgung)<br>Moteurs à double polarité (alimentation depuis ligne séparée) | BN 63 ... BN 132           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
|                                                                                                                                                                                                                                  | 230Δ / 400Y V ±10% – 50 Hz |
|                                                                                                                                                                                                                                  | 460Y V – 60 Hz             |

Su richiesta, sono disponibili tensioni speciali, nel campo 24...690 V, 50... 60 Hz.

Special voltages in the 24...690 V, 50... 60 Hz range are available at request.

Auf Anfrage können Sonderspannungen von 24...690 V, 50... 60 Hz geliefert werden.

Sur demande, des tensions spéciales sont disponibles dans la plage 24...690 V, 50... 60 Hz.



# - Dati tecnici freni FA

# - FA brake technical specifications

# - Technische Daten der Bremsen vom Typ FA

# - Caractéristiques techniques freins FA

(46)

| Freno<br>Brake<br>Bremsse<br>Frein | Coppia frenante $M_b$<br>Brake torque $M_b$<br>Bremsmoment $M_b$<br>Couple de freinage $M_b$ | Rilascio<br>Release<br>Ansprechzeit<br>Déblocage | Frenatura<br>Braking<br>Bremszeit<br>Freinage | W max     |            |             | W    | Pb   |
|------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------|-----------|------------|-------------|------|------|
|                                    |                                                                                              |                                                  |                                               | [J]       |            |             |      |      |
|                                    |                                                                                              |                                                  |                                               | 10<br>c/h | 100<br>c/h | 1000<br>c/h | [MJ] | [VA] |
| FA 02                              | 3.5                                                                                          | 4                                                | 20                                            | 4500      | 1400       | 180         | 15   | 60   |
| FA 03                              | 7.5                                                                                          | 4                                                | 40                                            | 7000      | 1900       | 230         | 25   | 80   |
| FA 04                              | 15                                                                                           | 6                                                | 60                                            | 10000     | 3100       | 350         | 30   | 110  |
| FA 14                              |                                                                                              |                                                  |                                               |           |            |             |      |      |
| FA 05                              | 40                                                                                           | 8                                                | 90                                            | 18000     | 4500       | 500         | 50   | 250  |
| FA 15                              |                                                                                              |                                                  |                                               |           |            |             |      |      |
| FA 06S                             | 60                                                                                           | 16                                               | 120                                           | 20000     | 4800       | 550         | 70   | 470  |
| FA 06                              | 75                                                                                           | 16                                               | 140                                           | 29000     | 7400       | 800         | 80   | 550  |
| FA 07                              | 150                                                                                          | 16                                               | 180                                           | 40000     | 9300       | 1000        | 130  | 600  |
| FA 08                              | 250                                                                                          | 20                                               | 200                                           | 60000     | 14000      | 1500        | 230  | 1200 |

## Legenda:

$M_b$  = max coppia frenante statica ( $\pm 15\%$ )  
 $t_1$  = tempo di rilascio del freno  
 $t_2$  = ritardo di frenatura  
 $W_{max}$  = energia max per frenata (capacità termica del freno)  
 $W$  = energia di frenatura tra due regolazioni successive del traferro  
 $P_b$  = potenza assorbita dal freno a 20°C (50 Hz)  
c/h = avviamenti orari

## Key:

$M_b$  = max static braking torque (15%)  
 $t_1$  = brake release time  
 $t_2$  = brake engagement time  
 $W_{max}$  = max energy per brake operation (brake thermal capacity)  
 $W$  = braking energy between two successive air gap adjustments  
 $P_b$  = brake power absorption at 20° (50 Hz)  
c/h = starts per hour

## Legende:

$M_b$  = statisches max. Bremsmoment ( $\pm 15\%$ )  
 $t_1$  = Bremsenansprechzeit  
 $t_2$  = Bremsverzögerung  
 $W_{max}$  = max. Energie pro Bremsung (Wärmeleistung der Bremse)  
 $W$  = Bremsenergie zwischen zwei Einstellungen des Luftspalts  
 $P_b$  = bei 20° von der Bremse aufgenommene Leistung (50 Hz)  
c/h = Schaltungen pro stunde

## Légende:

$M_b$  = couple de freinage statique max (15%)  
 $t_1$  = temps de déblocage frein  
 $t_2$  = retard de freinage  
 $W_{max}$  = énergie max par freinage (capacité thermique du frein)  
 $W$  = énergie de freinage entre deux réglages successifs de l'entrefer  
 $P_b$  = puissance absorbée par le frein à 20° (50 Hz)  
c/h = démarrages horaires

## N.B.

I valori di  $t_1$  e  $t_2$  riportati in tabella sono riferiti al freno tarato alla coppia nominale, traferro medio e tensione nominale.

## NOTE

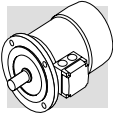
Values  $t_1$  and  $t_2$  in the table refer to a brake set at rated torque, medium air gap and rated voltage.

## HINWEIS:

Die in der Tabelle angegebenen Werte  $t_1$  und  $t_2$  beziehen sich auf eine Bremse, die auf das Nenndrehmoment, einen mittleren Luftspalt und die Standardspannung eingestellt ist.

## N.B.

Les valeurs de  $t_1$  et  $t_2$  indiquées dans le tableau se réfèrent au frein étaloné au couple nominal, entrefer moyen et tension nominale.



## - Collegamenti freno FA

Per i motori con alimentazione del freno derivata direttamente dall'alimentazione motore i collegamenti alla morsetteria corrispondono a quanto riportato nello schema (47):

## - FA brake connections

The diagram (47) shows the required connections to terminal box when brake is to be connected directly to motor power supply:

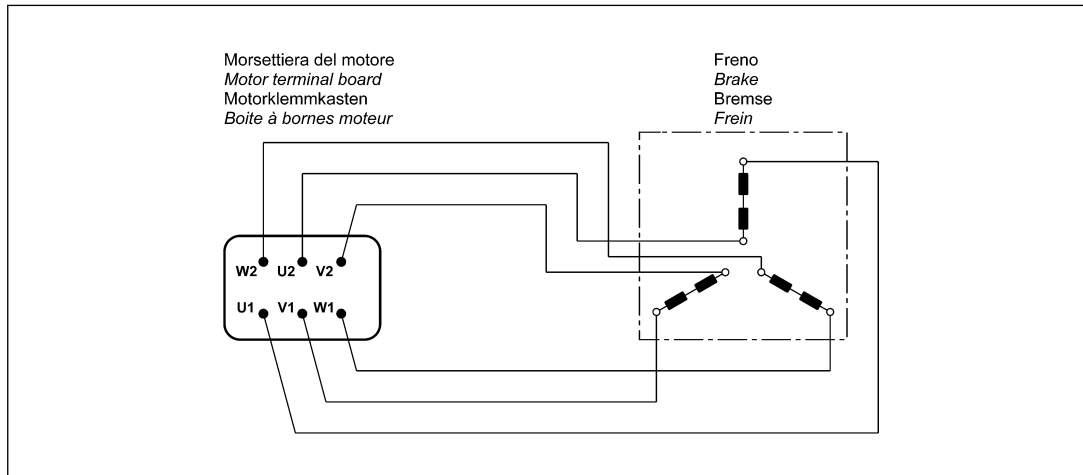
## - Abschlüsse - Bremstyp FA

Bei den Motoren mit direkter Bremsspannungsversorgung müssen die Anschlüsse im Klemmenkasten entsprechend den Angaben im Schema (47) angeschlossen werden:

## - Raccordements frein FA

Pour les moteurs avec alimentation du frein dérivant directement de l'alimentation moteur, les raccordements à la boîte à bornes correspondent aux indications du schéma (47) :

(47)



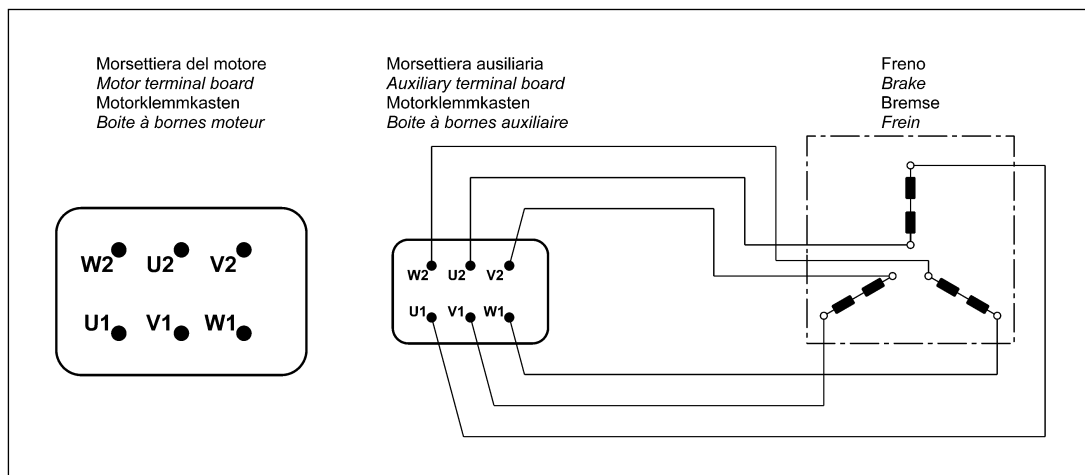
Per i motori a doppia polarità e, quando richiesto, per i motori ad una velocità con alimentazione da linea separata è prevista una morsetteria ausiliaria a 6 morsetti per il collegamento del freno; in questa esecuzione i motori prevedono la scatola coprimorsetti maggiorata. Vedi schema (48):

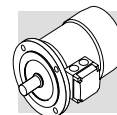
Switch-pole motors and, at request, single-pole motors with separate power supply line are equipped with an auxiliary terminal board with 6 terminals for brake connection. In this version, motors feature a larger terminal box. See diagram (48):

Bei den polumschaltbaren Motoren und, auf Anfrage, auch bei den einpoligen Motoren mit separater Bremsversorgung ist für den Anschluss der Bremse ein Hilfsklemmenkasten mit 6 Klemmen vorgesehen. In diesen Ausführungen haben die Motoren einen größeren Klemmenkasten. Siehe Schema (48):

Pour les moteurs à double polarité et, lorsque cela est requis, pour les moteurs à une vitesse avec alimentation depuis ligne séparée, une boîte à bornes auxiliaire à 6 bornes est prévue pour le raccordement du frein ; dans cette exécution les moteurs prévoient un couvercle bornier majoré. Voir schéma (48) :

(48)





**M27 - MOTORI AUTOFRENANTI  
IN C.A. TIPO BN\_BA**

**M27 - AC BRAKE MOTORS  
TYPE BN\_BA**

**M27 - WECHSELSTROMBREMS-  
MOTOREN MIT W.S.-  
BREMSE TYP BN\_BA**

**M27 - MOTEURS FREIN EN C.A.  
TYPE BN\_BA**

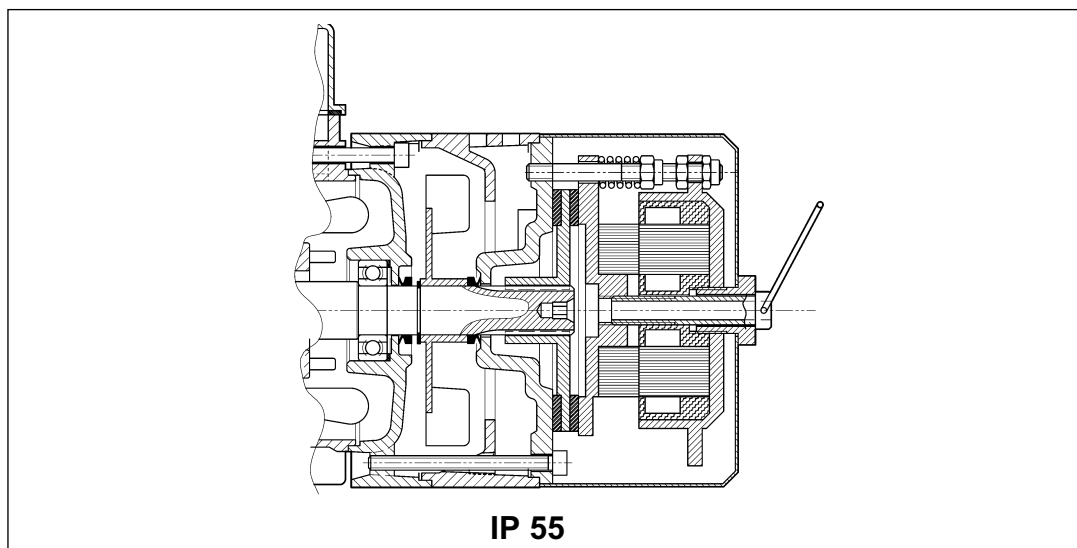
- **Grandezze:** BN 63 ... BN 132M

- **Frame sizes:** BN 63 ... BN 132M

- **Baugrößen:** BN 63 ... BN 132M

- **Tailles :** BN 63 ... BN 132M

(49)



**IP 55**

Freno elettromagnetico con alimentazione in **corrente alternata** trifase, fissato con viti allo scudo convogliatore.

Disco freno in acciaio scorrevole assialmente sull'albero motore scanalato (mozzo trascinatore in acciaio calettato sull'albero per grandezza 132).

I motori sono forniti con freno tarato alla massima coppia. La coppia freno è regolabile con continuità agendo sulle viti di compressione delle molle; il campo di regolazione consentito è  $30\% M_{bMAX} < M_b < M_{bMAX}$  ( $M_{bMAX}$  è il momento frenante max riportato in tab. (52)).

Di serie i motori sono forniti completi di vite per lo sblocco manuale del freno, con mantenimento della posizione di rilascio per consentire la rotazione dell'albero motore.

La vite di sblocco deve essere smontata dopo l'utilizzo per assicurare il corretto funzionamento del freno ed evitare situazioni potenzialmente pericolose.

Il freno BA, oltre alle elevate caratteristiche dinamiche tipiche dei freni in corrente alternata, presenta una costruzione robusta con energia di frenatura aumentata che lo rendono particolarmente idoneo a servizi pesanti oltre che in applicazioni dove sono richieste frequenze di manovra elevate e tempi d'intervento molto rapidi.

*Electromagnetic brake operates from three-phase **alternated current** power supply and is bolted onto conveyor shield.*

*Steel brake disc slides axially on splined motor shaft (steel drive hub is shrunk onto shaft on frame size 132).*

*Factory setting is maximum brake torque.*

*Step less braking torque adjustment by screws which compress the brake springs. Allowed adjustment range is  $30\% M_{bMAX} < M_b < M_{bMAX}$  ( $M_{bMAX}$  is maximum braking torque as shown in tab. (52)).*

*Motors are supplied complete with manual brake release screw as standard. Screw may be locked in the release position to allow for motor shaft rotation.*

*The brake release screw must be removed after use to ensure proper brake operation and avoid potentially dangerous conditions.*

*In addition to the high dynamic characteristics typical of AC brakes, a sturdy design and increased braking energy make the BA brake ideal for heavy-duty applications as well as applications requiring frequent stop/starts and very fast response time.*

Elektromagnetische Bremse mit Drehstromversorgung, die mittels Schrauben am Motorschild des Motors befestigt ist. Die Bremscheibe (Stahl) gleitet axial auf der Rotorwelle (bei Baugröße 132 über einem auf die Welle aufgezogenem Mitnehmer aus Stahl). Die Motoren werden mit einer auf das maximale Drehmoment des Motors eingestellten Bremse geliefert. Das Bremsdrehmoment ist durch Betätigen der Federdruckschrauben stufenlos regelbar. Der zulässige Einstellbereich beträgt  $30\% M_{bMAX} < M_b < M_{bMAX}$  ( $M_{bMAX}$  steht für den max. Bremsmoment, das in der Tab. (52) angegeben wird).

Die Motoren werden serienmäßig mit einer Schraube zur manuelle Bremslüftung geliefert; die arretierbar ist, um ein Drehen der Motorwelle zu ermöglichen. Diese Schraube muss im Betrieb des Motors wieder abmontiert werden, damit die korrekte Funktion der Bremse gesichert ist. Die Bremse vom Typ BA zeichnet sich durch ihre dynamischen Eigenschaften und die robuste Bauweise aus, durch die sie eine erhöhte Bremsenergie abzugeben kann. Diese Bremstypen eignen sich besonders für einen Einsatz unter harten Bedingungen und überall dort, wo häufige Schaltfrequenzen und schnelle Ansprechzeiten gefordert werden.

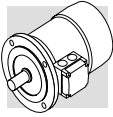
*Frein électromagnétique avec alimentation en **courant alternatif** triphasé, fixé avec des vis au bouclier.*

*Disque frein en acier coulissant de façon axiale sur l'arbre moteur rainuré (moyeu d'entraînement en acier calé sur l'arbre pour la taille 132).*

*Les moteurs sont fournis avec frein étalonné au couple maximal. Le couple de freinage est réglable en continu en intervenant sur les vis de compression des ressorts ; la plage de réglage autorisé est de  $30\% M_{bMAX} < M_b < M_{bMAX}$  ( $M_{bMAX}$  étant le couple de freinage maximum indiqué dans le tab. (52)).*

*De série, les moteurs sont fournis avec vis de déblocage manuel du frein, avec maintien de la position de relâchement afin de permettre la rotation de l'arbre moteur.*

*La vis de déblocage doit être démontée après utilisation afin de garantir le fonctionnement correct du frein et d'éviter les situations potentiellement dangereuses. Le frein BA, outre les caractéristiques dynamiques élevées typiques des freins en courant alternatif, est de fabrication robuste avec énergie de freinage majorée, ce qui le rend particulièrement adapté pour les services difficiles ainsi que pour les applications nécessitant des fréquences de manœuvre élevées et des temps d'intervention très rapides.*



#### - Grado di protezione

È disponibile un'unica esecuzione, con grado di protezione IP55.

#### - Degree of protection

Only available with degree of protection IP55.

#### - Schutzart

Es ist eine nur die Ausführung in Schutzklasse IP55 verfügbar.

#### - Degré de protection

Il est disponible en une exécution unique, avec degré de protection IP55.

#### - Alimentazione freno BA

Nei motori a singola polarità l'alimentazione della bobina freno è derivata direttamente dalla morsettiera motore e la tensione del freno quindi coincide con la tensione del motore. In questo caso la tensione del freno può essere omessa dalla designazione.

Per i motori a doppia polarità, e per i motori con alimentazione separata del freno, è presente una morsettiera ausiliaria con 6 terminali per il collegamento alla linea del freno. In entrambi i casi il valore di tensione del freno dovrà essere specificato in designazione.

Nella tabella seguente sono riportate le condizioni di alimentazione standard del freno in c.a. per i motori a singola e doppia polarità:

#### - BA brake power supply

In single-pole motors, power supply is brought to the brake coil direct from the motor terminal box. As a result, brake voltage and motor voltage are the same. In this case, brake voltage indication may be omitted in the designation.

Switch-pole motors and motors with separate brake power supply feature an auxiliary terminal board with 6 terminals for connection to brake line. In both cases, brake voltage indication in the designation is mandatory. The following table reports standard AC brake power supply ratings for single- and switch-pole motors:

#### - Stromversorgung - Bremstyp BA

Bei den einpoligen Motoren wird die Versorgung der Bremsenspule direkt vom Motorklemmenkasten abgezweigt, das bedeutet also, dass die Spannung der Bremse mit der Motorspannung übereinstimmt. In diesem Fall braucht die Bremsenspannung nicht extra angegeben werden. Für polumschaltbaren Motoren und für eine separate Bremsversorgung ist eine Hilfsklemmenleiste mit 6 Anschlüssen vorgesehen, die einen Anschluss der Bremse ermöglichen. In beiden Fällen muss die Bremsspannung bei der Bestellung angegeben werden.

In der nachstehenden Tabelle werden für die einpoligen und die polumschaltbaren Motoren die Standardversorgung der Wechselstrombremsen angegeben.

#### - Alimentation frein BA

Sur les moteurs à simple polarité, l'alimentation de la bobine frein dérive directement du bornier moteur, par conséquent, la tension du frein coïncide avec la tension du moteur. Dans ce cas, la tension du frein peut être omise de la désignation.

Pour les moteurs à double polarité et les moteurs avec alimentation séparée du frein, un boîte à bornes auxiliaire avec 6 bornes pour le raccordement au réseau du frein, est présente. Dans les deux cas, la valeur de tension du frein doit être spécifiée dans la désignation.

Le tableau suivant indique les conditions d'alimentation standard du frein en c.a. pour les moteurs à simple et double polarité :

(50)

| <b>Motori a singola polarità</b><br><b>Single-speed motors</b><br><b>Einpolige Motoren</b><br><b>Moteurs à simple polarité</b> | <b>BN 63 ... BN 132</b>     |
|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
|                                                                                                                                | 230Δ / 400Y V ± 10% – 50 Hz |
|                                                                                                                                | 265Δ / 460Y ± 10% - 60 Hz   |

(51)

| <b>Motori a doppia polarità</b> (alimentazione da linea separata)<br><b>Switch-pole motors</b> (separate power supply line)<br><b>Polumschaltbare Motoren</b> (separate Versorgung)<br><b>Moteurs à double polarité</b> (alimentation depuis ligne séparée) | <b>BN 63 ... BN 132</b>     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
|                                                                                                                                                                                                                                                             | 230Δ / 400Y V ± 10% – 50 Hz |
|                                                                                                                                                                                                                                                             | 460Y – 60 Hz                |

Se non diversamente specificato, l'alimentazione standard del freno è 230Δ / 400Y V - 50 Hz.

Su richiesta, sono disponibili tensioni speciali, nel campo 24...690 V, 50... 60 Hz.

Unless otherwise specified, standard brake power supply is 230Δ / 400Y V - 50 Hz.

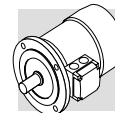
Special voltages in the 24...690 V, 50... 60 Hz range are available at request.

Falls nicht anderweitig angegeben, beträgt die Standardversorgung der Bremse 230Δ / 400Y V - 50 Hz.

Auf Anfrage können Sonderspannungen von 24...690 V, 50... 60 Hz geliefert werden.

Sauf spécification contraire, l'alimentation standard du frein est 230Δ / 400Y V - 50 Hz.

Sur demande, des tensions spéciales sont disponibles dans la plage 24...690 V, 50... 60 Hz.



#### - Dati tecnici freni BA

Nella tabella sottostante sono riportati i dati tecnici dei freni in c.a., tipo BA.

#### - BA brake technical specifications

The table below reports the technical specifications for AC brakes type BA.

#### - Technische Daten der Bremsen vom Typ BA

In der nachstehenden Tabelle werden die technischen Daten der Wechselstrombremsen vom Typ BA angegeben:

#### - Caractéristiques techniques freins BA

Le tableau ci-dessous indique les caractéristiques techniques des freins en c.a., type BA.

(52)

| Freno<br>Brake<br>Bremsen<br>Frein | Coppia frenante M <sub>b</sub><br>Brake torque M <sub>b</sub><br>Bremsmoment M <sub>b</sub><br>Couple de freinage M <sub>b</sub> | Rilascio<br>Release<br>Anspruchzeit<br>Déblocage | Frenatura<br>Braking<br>Bremszeit<br>Freinage | W max     |            |             | W   | Pb  |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------|-----------|------------|-------------|-----|-----|
|                                    |                                                                                                                                  |                                                  |                                               | [J]       |            |             |     |     |
|                                    |                                                                                                                                  |                                                  |                                               | 10<br>c/h | 100<br>c/h | 1000<br>c/h |     |     |
|                                    | [Nm]                                                                                                                             | t <sub>1</sub><br>[ms]                           | t <sub>2</sub><br>[ms]                        |           |            |             |     |     |
| BA 60                              | 5                                                                                                                                | 5                                                | 20                                            | 4000      | 1500       | 180         | 30  | 60  |
| BA 70                              | 8                                                                                                                                | 6                                                | 25                                            | 7000      | 2700       | 300         | 60  | 75  |
| BA 80                              | 18                                                                                                                               | 6                                                | 25                                            | 10000     | 3100       | 350         | 80  | 110 |
| BA 90                              | 35                                                                                                                               | 8                                                | 35                                            | 13000     | 3600       | 400         | 88  | 185 |
| BA 100                             | 50                                                                                                                               | 8                                                | 35                                            | 18000     | 4500       | 500         | 112 | 225 |
| BA 110                             | 75                                                                                                                               | 8                                                | 35                                            | 28000     | 6800       | 750         | 132 | 270 |
| BA 140                             | 150                                                                                                                              | 15                                               | 60                                            | 60000     | 14000      | 1500        | 240 | 530 |

#### Legenda:

$M_b$  = max coppia frenante statica ( $\pm 15\%$ )  
 $t_1$  = tempo di rilascio del freno  
 $t_2$  = ritardo di frenatura  
 $W_{max}$  = energia max per frenata (capacità termica del freno)  
 $W$  = energia di frenatura tra due regolazioni successive del traferro  
 $P_b$  = potenza assorbita dal freno a 20°C (50 Hz)  
 c/h = avviamenti orari

#### Legenda:

$M_b$  = max static braking torque (15%)  
 $t_1$  = brake release response time  
 $t_2$  = brake engagement time  
 $W_{max}$  = max energy per brake operation (brake thermal capacity)  
 $W$  = braking energy between two successive air gap adjustments  
 $P_b$  = brake power absorption at 20° (50 Hz)  
 c/h = starts per hour

#### Legende:

$M_b$  = statisches max. Bremsmoment ( $\pm 15\%$ )  
 $t_1$  = Bremsenansprechzeit  
 $t_2$  = Bremsverzögerung  
 $W_{max}$  = max. Energie pro Bremsung (Wärmeleistung der Bremse)  
 $W$  = Bremsenergie zwischen zwei Einstellungen des Luftspalts  
 $P_b$  = bei 20° von der Bremse aufgenommene Leistung (50 Hz)  
 c/h = Schaltungen pro stunde

#### Légende:

$M_b$  = couple de freinage statique max (15%)  
 $t_1$  = temps de déblocage frein  
 $t_2$  = retard de freinage  
 $W_{max}$  = énergie max par freinage (capacité thermique du frein)  
 $W$  = énergie de freinage entre deux réglages successifs de l'entrefer  
 $P_b$  = puissance absorbée par le frein à 20° (50 Hz)  
 c/h = démarrages horaires

#### N.B.

I valori di  $t_1$  e  $t_2$  riportati in tabella sono riferiti al freno tarato alla coppia nominale, traferro medio e tensione nominale.

#### NOTE :

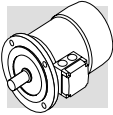
Values  $t_1$  and  $t_2$  in the table refer to a brake set at rated torque, medium air gap and rated voltage.

#### HINWEIS:

Die in der Tabelle angegebenen Werte  $t_1$  und  $t_2$  beziehen sich auf eine Bremse, die auf das Nenndrehmoment, einen mittleren Luftspalt und die Standardspannung eingestellt ist.

#### N.B.

Les valeurs de  $t_1$  et  $t_2$  indiquées dans le tableau se réfèrent au frein étalonné au couple nominal, entrefer moyen et tension nominale.



## - Collegamenti freno BA

Per i motori con alimentazione del freno derivata direttamente dall'alimentazione motore i collegamenti alla morsetteria corrispondono a quanto riportato nello schema (53):

## - BA brake connections

The diagram (53) shows the required connections to terminal box when brake is to be connected directly to motor power supply:

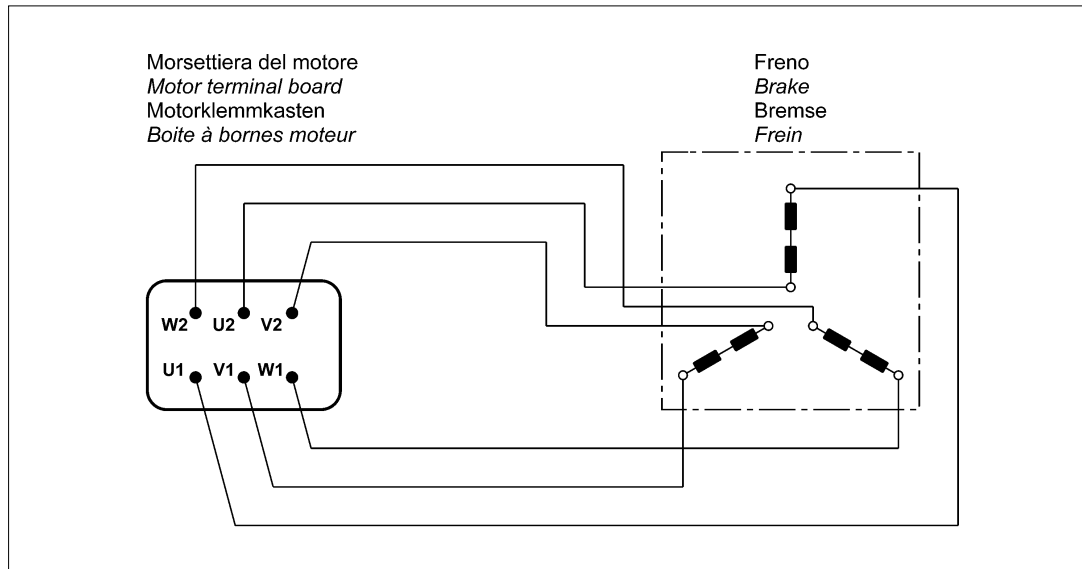
## - Anschlüsse - Bremstyp BA

Bei den Motoren mit einer direkt von der Motorspannung gespeisten Bremsversorgung müssen die Bremsen entsprechend der Angaben im Schema (53) angeschlossen werden:

## - Raccordements frein BA

Pour les moteurs avec alimentation du frein dérivant directement de l'alimentation moteur, les raccordements à la boîte à bornes correspondent aux indications du schéma (53) :

(53)



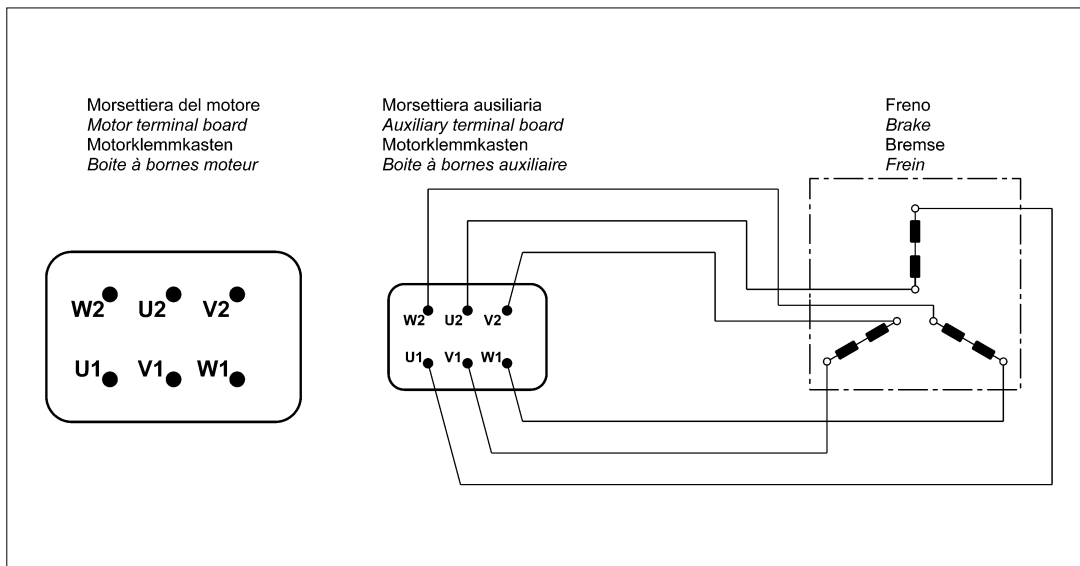
Per i motori a doppia polarità e, quando richiesto, per i motori ad una velocità con alimentazione da linea separata è prevista una morsetteria ausiliaria a 6 morsetti per il collegamento del freno; in questa esecuzione i motori prevedono la scatola coprimorsetti maggiorata. Vedi schema (54):

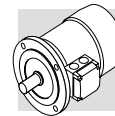
Switch-pole motors and, at request, single-pole motors with separate power supply line are equipped with an auxiliary terminal board with 6 terminals for brake connection. In this version, motors feature a larger terminal box. See diagram (54):

Bei den polumschaltbaren Motoren und, auf Anfrage, auch bei den eintpoligen Motoren mit separater Bremsversorgung ist für den Anschluss der Bremse ein Hilfsklemmenkasten mit 6 Klemmen vorgesehen. In dieser Ausführungen haben die Motoren einen größeren Klemmenkasten. Siehe Schema (54):

Pour les moteurs à double polarité et, lorsque cela est requis, pour les moteurs à une vitesse avec alimentation depuis ligne séparée, une boîte à bornes auxiliaire à 6 bornes est prévue pour le raccordement du frein ; dans cette exécution les moteurs prévoient un couvercle bornier majoré. Voir schéma (54) :

(54)





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**M28 - DATI TECNICI MOTORI**

***M28 - MOTOR RATING CHARTS***

**M28 - MOTORENAUSWAHL-  
TABELLEN**

***M28 - DONNEES TECHNIQUES  
DES MOTEURS***

**2 P****3000 min<sup>-1</sup> - S1****50 Hz**

|  |                                                                                   |                   |      |             |            |       |              |          |          |          |                          |                                                                                            | freno c.c. / d.c. brake<br>G.S.-bremse / frein c.c. |      |                |                          |                                                                                            | freno c.a. / a.c. brake<br>W.S.-bremse / frein c.a.                               |               |                |                          |                                                                                            |                                                                                   |               |                |                          |                                                                                            |                                                                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------|------|-------------|------------|-------|--------------|----------|----------|----------|--------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------|------|----------------|--------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------|----------------|--------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------|----------------|--------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|
|                                                                                   |                                                                                   |                   |      |             |            |       |              |          |          |          |                          |                                                                                            | FD                                                  |      |                |                          |                                                                                            | FA                                                                                |               |                |                          |                                                                                            | BA                                                                                |               |                |                          |                                                                                            |                                                                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Pn                                                                                |  | n                 | Mn   | η<br>(100%) | η<br>(75%) | cos φ | In<br>[400V] | Is<br>In | Ms<br>Mn | Ma<br>Mn | Jm<br>x 10 <sup>-4</sup> | IM B5<br> | Mod.                                                | Mb   | Z <sub>o</sub> | Jm<br>x 10 <sup>-4</sup> | IM B5<br> | Mod.                                                                              | Mb            | Z <sub>o</sub> | Jm<br>x 10 <sup>-4</sup> | IM B5<br> | Mod.                                                                              | Mb<br>max     | Z <sub>o</sub> | Jm<br>x 10 <sup>-4</sup> | IM B5<br> |                                                                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| kW                                                                                |                                                                                   | min <sup>-1</sup> | Nm   | %           | %          |       | A            |          |          |          | kgm <sup>2</sup>         |           |                                                     | Nm   | NB             | SB                       | Kgm <sup>2</sup>                                                                           |  |               | Nm             | 1/h                      | kgm <sup>2</sup>                                                                           |  |               | Nm             | 1/h                      | kgm <sup>2</sup>                                                                           |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 0.18                                                                              | <b>BN 63A</b>                                                                     | <b>2</b>          | 2730 | 0.63        | 59.9       | 56.9  | 0.77         | 0.56     | 3.0      | 2.1      | 2                        | 3.5                                                                                        | <b>FD 02</b>                                        | 1.75 | 3900           | 4800                     | 2.6                                                                                        | 5.2                                                                               | <b>FA 02</b>  | 1.75           | 4800                     | 2.6                                                                                        | 5.0                                                                               | <b>BA 60</b>  | 5              | 3500                     | 4.0                                                                                        | 5.8                                                                               |  |  |  |  |  |  |  |  |  |  |  |  |
| 0.25                                                                              | <b>BN 63B</b>                                                                     | <b>2</b>          | 2740 | 0.87        | 66.0       | 64.8  | 0.76         | 0.72     | 3.3      | 2.3      | 2.3                      | 3.9                                                                                        | <b>FD 02</b>                                        | 1.75 | 3900           | 4800                     | 3.0                                                                                        | 5.6                                                                               | <b>FA 02</b>  | 1.75           | 4800                     | 3.0                                                                                        | 5.4                                                                               | <b>BA 60</b>  | 5              | 3600                     | 4.3                                                                                        | 6.2                                                                               |  |  |  |  |  |  |  |  |  |  |  |  |
| 0.37                                                                              | <b>BN 63C</b>                                                                     | <b>2</b>          | 2800 | 1.26        | 69.1       | 66.8  | 0.78         | 0.99     | 3.9      | 2.6      | 2.6                      | 3.3                                                                                        | <b>FD 02</b>                                        | 3.5  | 3600           | 4500                     | 3.9                                                                                        | 6.8                                                                               | <b>FA 02</b>  | 3.5            | 4500                     | 3.9                                                                                        | 6.6                                                                               | <b>BA 60</b>  | 5              | 3500                     | 5.3                                                                                        | 7.4                                                                               |  |  |  |  |  |  |  |  |  |  |  |  |
| 0.37                                                                              | <b>BN 71A</b>                                                                     | <b>2</b>          | 2820 | 1.25        | 73.8       | 73.0  | 0.76         | 0.95     | 4.8      | 2.8      | 2.6                      | 3.5                                                                                        | <b>FD 03</b>                                        | 3.5  | 3000           | 4100                     | 4.6                                                                                        | 8.1                                                                               | <b>FA 03</b>  | 3.5            | 4200                     | 4.6                                                                                        | 7.8                                                                               | <b>BA 70</b>  | 8              | 3500                     | 5.5                                                                                        | 9.3                                                                               |  |  |  |  |  |  |  |  |  |  |  |  |
| 0.55                                                                              | <b>BN 71B</b>                                                                     | <b>2</b>          | 2820 | 1.86        | 76.0       | 75.8  | 0.76         | 1.37     | 5.0      | 2.9      | 2.8                      | 4.1                                                                                        | <b>FD 03</b>                                        | 5    | 2900           | 4200                     | 5.3                                                                                        | 8.9                                                                               | <b>FA 03</b>  | 5              | 4200                     | 5.3                                                                                        | 8.6                                                                               | <b>BA 70</b>  | 8              | 3600                     | 6.1                                                                                        | 10.1                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |
| 0.75                                                                              | <b>BN 71C</b>                                                                     | <b>2</b>          | 2810 | 2.6         | 76.6       | 76.2  | 0.76         | 1.86     | 5.1      | 3.1      | 2.8                      | 5.0                                                                                        | <b>FD 03</b>                                        | 5    | 1900           | 3300                     | 6.1                                                                                        | 10                                                                                | <b>FA 03</b>  | 5              | 3600                     | 6.1                                                                                        | 9.7                                                                               | <b>BA 70</b>  | 8              | 3200                     | 7.0                                                                                        | 11.2                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |
| 0.75                                                                              | <b>BN 80A</b>                                                                     | <b>2</b>          | 2810 | 2.6         | 76.2       | 75.5  | 0.81         | 1.75     | 4.8      | 2.6      | 2.2                      | 7.8                                                                                        | <b>FD 04</b>                                        | 5    | 1700           | 3200                     | 9.4                                                                                        | 12.5                                                                              | <b>FA 04</b>  | 5              | 3200                     | 9.4                                                                                        | 12.4                                                                              | <b>BA 80</b>  | 18             | 2800                     | 10.8                                                                                       | 13.9                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |
| 1.1                                                                               | <b>BN 80B</b>                                                                     | <b>2</b>          | 2800 | 3.8         | 76.4       | 76.2  | 0.81         | 2.57     | 4.8      | 2.8      | 2.4                      | 9.0                                                                                        | <b>FD 04</b>                                        | 10   | 1500           | 3000                     | 10.6                                                                                       | 13.4                                                                              | <b>FA 04</b>  | 10             | 3000                     | 10.6                                                                                       | 13.3                                                                              | <b>BA 80</b>  | 18             | 2700                     | 12.0                                                                                       | 14.8                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |
| 1.5                                                                               | <b>BN 80C</b>                                                                     | <b>2</b>          | 2800 | 5.1         | 79.1       | 79.5  | 0.81         | 3.4      | 4.9      | 2.7      | 2.4                      | 11.4                                                                                       | <b>FD 04</b>                                        | 15   | 1300           | 2600                     | 13.0                                                                                       | 15.2                                                                              | <b>FA 04</b>  | 15             | 2600                     | 13.0                                                                                       | 15.1                                                                              | <b>BA 80</b>  | 18             | 2400                     | 14.4                                                                                       | 16.6                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |
| 1.5                                                                               | <b>BN 90SA</b>                                                                    | <b>2</b>          | 2870 | 5.0         | 82.0       | 81.5  | 0.80         | 3.3      | 5.9      | 2.7      | 2.6                      | 12.5                                                                                       | <b>FD 14</b>                                        | 15   | 900            | 2200                     | 14.1                                                                                       | 16.5                                                                              | <b>FA 14</b>  | 15             | 2200                     | 14.1                                                                                       | 16.4                                                                              | <b>BA 90</b>  | 35             | 1600                     | 19.5                                                                                       | 19.6                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |
| 1.85                                                                              | <b>BN 90SB</b>                                                                    | <b>2</b>          | 2880 | 6.1         | 82.5       | 82.0  | 0.80         | 4.0      | 6.2      | 2.9      | 2.6                      | 16.7                                                                                       | <b>FD 14</b>                                        | 15   | 900            | 2200                     | 18.3                                                                                       | 18.2                                                                              | <b>FA 14</b>  | 15             | 2200                     | 18.3                                                                                       | 18.1                                                                              | <b>BA 90</b>  | 35             | 1700                     | 23.7                                                                                       | 21.3                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |
| 2.2                                                                               | <b>BN 90L</b>                                                                     | <b>2</b>          | 2880 | 7.3         | 82.7       | 82.1  | 0.80         | 4.8      | 6.3      | 2.9      | 2.7                      | 16.7                                                                                       | <b>FD 05</b>                                        | 26   | 900            | 2200                     | 21                                                                                         | 20                                                                                | <b>FA 05</b>  | 26             | 2200                     | 21                                                                                         | 20.7                                                                              | <b>BA 90</b>  | 35             | 1700                     | 24                                                                                         | 21.3                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |
| 3                                                                                 | <b>BN 100L</b>                                                                    | <b>2</b>          | 2860 | 10.0        | 82.8       | 82.6  | 0.79         | 6.6      | 5.7      | 2.6      | 2.2                      | 31                                                                                         | <b>FD 15</b>                                        | 26   | 700            | 1600                     | 35                                                                                         | 26                                                                                | <b>FA 15</b>  | 26             | 1600                     | 35                                                                                         | 27                                                                                | <b>BA 100</b> | 50             | 1300                     | 43                                                                                         | 30                                                                                |  |  |  |  |  |  |  |  |  |  |  |  |
| 4                                                                                 | <b>BN 100LB</b>                                                                   | <b>2</b>          | 2870 | 13.3        | 84.3       | 84.4  | 0.80         | 8.6      | 5.9      | 2.7      | 2.5                      | 39                                                                                         | <b>FD 15</b>                                        | 40   | 450            | 900                      | 43                                                                                         | 29                                                                                | <b>FA 15</b>  | 40             | 1000                     | 43                                                                                         | 30                                                                                | <b>BA 100</b> | 50             | 850                      | 51                                                                                         | 33                                                                                |  |  |  |  |  |  |  |  |  |  |  |  |
| 4                                                                                 | <b>BN 112M</b>                                                                    | <b>2</b>          | 2900 | 13.2        | 85.5       | 84.5  | 0.82         | 8.2      | 6.9      | 3        | 2.9                      | 57                                                                                         | <b>FD 06S</b>                                       | 40   | —              | 950                      | 66                                                                                         | 39                                                                                | <b>FA 06S</b> | 40             | 950                      | 66                                                                                         | 40                                                                                | <b>BA 110</b> | 75             | 850                      | 73                                                                                         | 41                                                                                |  |  |  |  |  |  |  |  |  |  |  |  |
| 5.5                                                                               | <b>BN 132SA</b>                                                                   | <b>2</b>          | 2890 | 18.2        | 86.1       | 85.7  | 0.84         | 11.0     | 6        | 2.6      | 2.2                      | 101                                                                                        | <b>FD 06</b>                                        | 50   | —              | 600                      | 112                                                                                        | 48                                                                                | <b>FA 06</b>  | 50             | 600                      | 112                                                                                        | 49                                                                                | <b>BA 140</b> | 150            | 500                      | 151                                                                                        | 67                                                                                |  |  |  |  |  |  |  |  |  |  |  |  |
| 7.5                                                                               | <b>BN 132SB</b>                                                                   | <b>2</b>          | 2900 | 25          | 87.2       | 87.1  | 0.85         | 14.6     | 6.4      | 2.6      | 2.2                      | 145                                                                                        | <b>FD 06</b>                                        | 50   | —              | 550                      | 154                                                                                        | 55                                                                                | <b>FA 06</b>  | 50             | 550                      | 154                                                                                        | 56                                                                                | <b>BA 140</b> | 150            | 450                      | 195                                                                                        | 74                                                                                |  |  |  |  |  |  |  |  |  |  |  |  |
| 9.2                                                                               | <b>BN 132M</b>                                                                    | <b>2</b>          | 2930 | 30          | 89.0       | 88.5  | 0.86         | 17.3     | 6.9      | 2.8      | 2.3                      | 178                                                                                        | <b>FD 56</b>                                        | 75   | —              | 430                      | 189                                                                                        | 66                                                                                | <b>FA 06</b>  | 75             | 430                      | 189                                                                                        | 67                                                                                | <b>BA 140</b> | 150            | 400                      | 228                                                                                        | 85                                                                                |  |  |  |  |  |  |  |  |  |  |  |  |
| 11                                                                                | <b>BN 160MR</b>                                                                   | <b>2</b>          | 2920 | 36          | 89.1       | 88.9  | 0.88         | 20.2     | 7.0      | 2.9      | 2.5                      | 210                                                                                        |                                                     |      |                |                          |                                                                                            |                                                                                   |               |                |                          |                                                                                            |                                                                                   |               |                |                          |                                                                                            |                                                                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| 15                                                                                | <b>BN 160MB</b>                                                                   | <b>2</b>          | 2930 | 49          | 89.6       | 89.4  | 0.86         | 28.1     | 7.1      | 2.6      | 2.3                      | 340                                                                                        |                                                     |      |                |                          |                                                                                            |                                                                                   |               |                |                          |                                                                                            |                                                                                   |               |                |                          |                                                                                            |                                                                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| 18.5                                                                              | <b>BN 160L</b>                                                                    | <b>2</b>          | 2930 | 60          | 90.4       | 90.1  | 0.86         | 34       | 7.6      | 2.7      | 2.3                      | 420                                                                                        |                                                     |      |                |                          |                                                                                            |                                                                                   |               |                |                          |                                                                                            |                                                                                   |               |                |                          |                                                                                            |                                                                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| 22                                                                                | <b>BN 180M</b>                                                                    | <b>2</b>          | 2930 | 72          | 91.3       | 91.3  | 0.88         | 40       | 7.8      | 2.6      | 2.4                      | 490                                                                                        |                                                     |      |                |                          |                                                                                            |                                                                                   |               |                |                          |                                                                                            |                                                                                   |               |                |                          |                                                                                            |                                                                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| 30                                                                                | <b>BN 200LA</b>                                                                   | <b>2</b>          | 2930 | 98          | 91.9       | 91.4  | 0.89         | 53       | 7.9      | 2.7      | 2.9                      | 770                                                                                        |                                                     |      |                |                          |                                                                                            |                                                                                   |               |                |                          |                                                                                            |                                                                                   |               |                |                          |                                                                                            |                                                                                   |  |  |  |  |  |  |  |  |  |  |  |  |

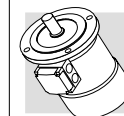
4 P

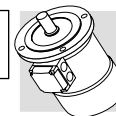
1500 min<sup>-1</sup> - S1

50 Hz



|  |                                                                                   |                            |              |                      |                     |       |                               |                                  |                                  |                                  |                                                              |                                                                                                | freno c.c. / d.c. brake<br>G.S.-bremse / frein c.c. |              |                           |       |                                                              | freno c.a. / a.c. brake<br>W.S.-bremse / frein c.a.                                              |      |              |                           |                                                              |                                                                                                  |      |                     |                           |                                                              |                                                                                                  |      |    |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------|--------------|----------------------|---------------------|-------|-------------------------------|----------------------------------|----------------------------------|----------------------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------|--------------|---------------------------|-------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------|--------------|---------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------|---------------------|---------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------|----|
| Pn<br><br>kW                                                                      |  | n<br><br>min <sup>-1</sup> | Mn<br><br>Nm | η<br>(100%)<br><br>% | η<br>(75%)<br><br>% | cos φ | I <sub>n</sub><br>[400V]<br>A | I <sub>s</sub><br>I <sub>n</sub> | M <sub>s</sub><br>M <sub>n</sub> | M <sub>a</sub><br>M <sub>n</sub> | J <sub>m</sub><br>x 10 <sup>-4</sup><br><br>kgm <sup>2</sup> | IM B5<br><br> | Mod                                                 | Mb<br><br>Nm | Z <sub>o</sub><br><br>1/h |       | J <sub>m</sub><br>x 10 <sup>-4</sup><br><br>kgm <sup>2</sup> | IM B5<br><br> | Mod. | Mb<br><br>Nm | Z <sub>o</sub><br><br>1/h | J <sub>m</sub><br>x 10 <sup>-4</sup><br><br>kgm <sup>2</sup> | IM B5<br><br> | Mod. | Mb<br>max<br><br>Nm | Z <sub>o</sub><br><br>1/h | J <sub>m</sub><br>x 10 <sup>-4</sup><br><br>kgm <sup>2</sup> | IM B5<br><br> |      |    |
|                                                                                   |                                                                                   |                            |              |                      |                     |       |                               |                                  |                                  |                                  |                                                              |                                                                                                |                                                     |              | NB                        | SB    |                                                              |                                                                                                  |      |              |                           |                                                              |                                                                                                  |      |                     |                           |                                                              |                                                                                                  | NB   | SB |
| 0.06                                                                              | BN 56A                                                                            | 4                          | 1340         | 0.43                 | 46.8                | 44.2  | 0.65                          | 0.28                             | 2.6                              | 2.3                              | 2.0                                                          | 1.5                                                                                            | 3.1                                                 |              |                           |       |                                                              |                                                                                                  |      |              |                           |                                                              |                                                                                                  |      |                     |                           |                                                              |                                                                                                  |      |    |
| 0.09                                                                              | BN 56B                                                                            | 4                          | 1350         | 0.64                 | 51.7                | 47.6  | 0.60                          | 0.42                             | 2.6                              | 2.5                              | 2.4                                                          | 1.5                                                                                            | 3.1                                                 |              |                           |       |                                                              |                                                                                                  |      |              |                           |                                                              |                                                                                                  |      |                     |                           |                                                              |                                                                                                  |      |    |
| 0.12                                                                              | BN 63A                                                                            | 4                          | 1350         | 0.85                 | 59.8                | 56.2  | 0.62                          | 0.47                             | 2.6                              | 1.9                              | 1.8                                                          | 2.0                                                                                            | 3.5                                                 | FD 02        | 1.75                      | 10000 | 13000                                                        | 2.6                                                                                              | 5.2  | FA 02        | 1.75                      | 13000                                                        | 2.6                                                                                              | 5.0  | BA 60               | 5                         | 9000                                                         | 4.0                                                                                              | 5.8  |    |
| 0.18                                                                              | BN 63B                                                                            | 4                          | 1320         | 1.30                 | 54.8                | 52.9  | 0.67                          | 0.71                             | 2.6                              | 2.2                              | 2.0                                                          | 2.3                                                                                            | 3.9                                                 | FD 02        | 3.5                       | 10000 | 13000                                                        | 3.0                                                                                              | 5.6  | FA 02        | 3.5                       | 13000                                                        | 3.0                                                                                              | 5.4  | BA 60               | 5                         | 9000                                                         | 4.3                                                                                              | 6.2  |    |
| 0.25                                                                              | BN 63C                                                                            | 4                          | 1340         | 1.78                 | 65.3                | 65.0  | 0.69                          | 0.80                             | 2.7                              | 2.1                              | 1.9                                                          | 3.3                                                                                            | 5.1                                                 | FD 02        | 3.5                       | 7800  | 10000                                                        | 3.9                                                                                              | 6.8  | FA 02        | 3.5                       | 10000                                                        | 3.9                                                                                              | 6.6  | BA 60               | 5                         | 8500                                                         | 5.3                                                                                              | 7.4  |    |
| 0.25                                                                              | BN 71A                                                                            | 4                          | 1380         | 1.73                 | 63.7                | 62.2  | 0.73                          | 0.78                             | 3.3                              | 1.9                              | 1.7                                                          | 5.8                                                                                            | 5.1                                                 | FD 03        | 3.5                       | 7700  | 11000                                                        | 6.9                                                                                              | 7.8  | FA 03        | 3.5                       | 11000                                                        | 6.9                                                                                              | 7.5  | BA 70               | 8                         | 9700                                                         | 7.8                                                                                              | 9.0  |    |
| 0.37                                                                              | BN 71B                                                                            | 4                          | 1370         | 2.6                  | 66.8                | 66.7  | 0.76                          | 1.05                             | 3.7                              | 2.0                              | 1.9                                                          | 6.9                                                                                            | 5.9                                                 | FD 03        | 5.0                       | 6000  | 9400                                                         | 8.0                                                                                              | 8.6  | FA 03        | 5.0                       | 9400                                                         | 8.0                                                                                              | 8.3  | BA 70               | 8                         | 8500                                                         | 8.9                                                                                              | 9.8  |    |
| 0.55                                                                              | BN 71C                                                                            | 4                          | 1380         | 3.8                  | 69.0                | 68.9  | 0.74                          | 1.55                             | 4.1                              | 2.3                              | 2.3                                                          | 9.1                                                                                            | 7.3                                                 | FD 53        | 7.5                       | 4300  | 8700                                                         | 10.2                                                                                             | 10   | FA 03        | 7.5                       | 8700                                                         | 10.2                                                                                             | 9.7  | BA 70               | 8                         | 8000                                                         | 11.1                                                                                             | 11.2 |    |
| 0.55                                                                              | BN 80A                                                                            | 4                          | 1390         | 3.8                  | 72.0                | 71.3  | 0.77                          | 1.43                             | 4.1                              | 2.3                              | 2.0                                                          | 15                                                                                             | 8.2                                                 | FD 04        | 10                        | 4100  | 8000                                                         | 16.6                                                                                             | 12.1 | FA 04        | 10                        | 8000                                                         | 16.6                                                                                             | 12.0 | BA 80               | 18                        | 7400                                                         | 18                                                                                               | 13.3 |    |
| 0.75                                                                              | BN 80B                                                                            | 4                          | 1400         | 5.1                  | 75.0                | 74.5  | 0.78                          | 1.85                             | 4.9                              | 2.7                              | 2.5                                                          | 20                                                                                             | 9.9                                                 | FD 04        | 15                        | 4100  | 7800                                                         | 22                                                                                               | 13.8 | FA 04        | 15                        | 7800                                                         | 22                                                                                               | 13.7 | BA 80               | 18                        | 7400                                                         | 23                                                                                               | 15.2 |    |
| 1.1                                                                               | BN 80C                                                                            | 4                          | 1400         | 7.5                  | 76.4                | 76.2  | 0.78                          | 2.66                             | 5.1                              | 2.8                              | 2.5                                                          | 25                                                                                             | 11.3                                                | FD 04        | 15                        | 2600  | 5300                                                         | 27                                                                                               | 15.2 | FA 04        | 15                        | 5300                                                         | 27                                                                                               | 15.1 | BA 80               | 18                        | 5100                                                         | 28                                                                                               | 16.6 |    |
| 1.1                                                                               | BN 90S                                                                            | 4                          | 1400         | 7.5                  | 76.5                | 76.2  | 0.77                          | 2.70                             | 4.6                              | 2.6                              | 2.2                                                          | 21                                                                                             | 12.2                                                | FD 14        | 15                        | 4800  | 8000                                                         | 23                                                                                               | 16.4 | FA 14        | 15                        | 8000                                                         | 23                                                                                               | 16.3 | BA 90               | 35                        | 6500                                                         | 28                                                                                               | 19.5 |    |
| 1.5                                                                               | BN 90LA                                                                           | 4                          | 1390         | 10.3                 | 78.7                | 78.5  | 0.77                          | 3.6                              | 5.3                              | 2.8                              | 2.4                                                          | 28                                                                                             | 13.6                                                | FD 05        | 26                        | 3400  | 6000                                                         | 32                                                                                               | 19.6 | FA 05        | 26                        | 6000                                                         | 32                                                                                               | 20.3 | BA 90               | 35                        | 5400                                                         | 35                                                                                               | 21   |    |
| 1.85                                                                              | BN 90LB                                                                           | 4                          | 1390         | 12.7                 | 81.0                | 81.4  | 0.78                          | 4.2                              | 5.2                              | 2.8                              | 2.6                                                          | 30                                                                                             | 15.1                                                | FD 05        | 26                        | 3200  | 5900                                                         | 34                                                                                               | 21.1 | FA 05        | 26                        | 5900                                                         | 34                                                                                               | 21.8 | BA 90               | 35                        | 5400                                                         | 37                                                                                               | 22   |    |
| 2.2                                                                               | BN 100LA                                                                          | 4                          | 1410         | 14.9                 | 81.1                | 81.4  | 0.75                          | 5.2                              | 4.5                              | 2.2                              | 2.0                                                          | 40                                                                                             | 18.3                                                | FD 15        | 40                        | 2600  | 4700                                                         | 44                                                                                               | 25   | FA 15        | 40                        | 4700                                                         | 44                                                                                               | 25   | BA 100              | 50                        | 4000                                                         | 52                                                                                               | 29   |    |
| 3                                                                                 | BN 100LB                                                                          | 4                          | 1410         | 20                   | 82.6                | 83.8  | 0.77                          | 6.8                              | 5                                | 2.3                              | 2.2                                                          | 54                                                                                             | 22                                                  | FD 15        | 40                        | 2400  | 4400                                                         | 58                                                                                               | 28   | FA 15        | 40                        | 4400                                                         | 58                                                                                               | 29   | BA 100              | 50                        | 3800                                                         | 66                                                                                               | 32   |    |
| 4                                                                                 | BN 112M                                                                           | 4                          | 1430         | 27                   | 84.4                | 84.2  | 0.81                          | 8.4                              | 5.6                              | 2.7                              | 2.5                                                          | 98                                                                                             | 30                                                  | FD 06S       | 60                        | —     | 1400                                                         | 107                                                                                              | 40   | FA 06S       | 60                        | 2100                                                         | 107                                                                                              | 42   | BA 110              | 75                        | 2000                                                         | 114                                                                                              | 43   |    |
| 5.5                                                                               | BN 132S                                                                           | 4                          | 1440         | 36                   | 86.3                | 86.4  | 0.80                          | 11.5                             | 5.5                              | 2.3                              | 2.2                                                          | 213                                                                                            | 44                                                  | FD 56        | 75                        | —     | 1050                                                         | 223                                                                                              | 57   | FA 06        | 75                        | 1200                                                         | 223                                                                                              | 58   | BA 140              | 150                       | 1200                                                         | 263                                                                                              | 76   |    |
| 7.5                                                                               | BN 132MA                                                                          | 4                          | 1440         | 50                   | 87.0                | 87.1  | 0.80                          | 15.6                             | 5.7                              | 2.5                              | 2.4                                                          | 270                                                                                            | 53                                                  | FD 06        | 100                       | —     | 950                                                          | 280                                                                                              | 66   | FA 07        | 100                       | 1000                                                         | 280                                                                                              | 71   | BA 140              | 150                       | 1000                                                         | 320                                                                                              | 85   |    |
| 9.2                                                                               | BN 132MB                                                                          | 4                          | 1440         | 61                   | 88.4                | 88.6  | 0.80                          | 18.8                             | 5.9                              | 2.7                              | 2.5                                                          | 319                                                                                            | 59                                                  | FD 07        | 150                       | —     | 900                                                          | 342                                                                                              | 75   | FA 07        | 150                       | 900                                                          | 342                                                                                              | 77   | BA 140              | 150                       | 900                                                          | 369                                                                                              | 91   |    |
| 11                                                                                | BN 160MR                                                                          | 4                          | 1440         | 73                   | 88.4                | 88.8  | 0.81                          | 22.2                             | 5.9                              | 2.7                              | 2.5                                                          | 360                                                                                            | 70                                                  | FD 07        | 150                       | —     | 850                                                          | 382                                                                                              | 86   | FA 07        | 150                       | 850                                                          | 382                                                                                              | 88   |                     |                           |                                                              |                                                                                                  |      |    |
| 15                                                                                | BN 160L                                                                           | 4                          | 1460         | 98                   | 89.9                | 89.4  | 0.81                          | 29.7                             | 5.9                              | 2.3                              | 2.1                                                          | 650                                                                                            | 99                                                  | FD 08        | 200                       | —     | 750                                                          | 725                                                                                              | 129  | FA 08        | 200                       | 750                                                          | 710                                                                                              | 128  |                     |                           |                                                              |                                                                                                  |      |    |
| 18.5                                                                              | BN 180M                                                                           | 4                          | 1460         | 121                  | 90.0                | 90.1  | 0.81                          | 37                               | 6.2                              | 2.6                              | 2.5                                                          | 790                                                                                            | 115                                                 | FD 08        | 250                       | —     | 700                                                          | 865                                                                                              | 145  | FA 08        | 250                       | 700                                                          | 850                                                                                              | 144  |                     |                           |                                                              |                                                                                                  |      |    |
| 22                                                                                | BN 180L                                                                           | 4                          | 1460         | 144                  | 90.7                | 91.1  | 0.81                          | 43                               | 6.5                              | 2.5                              | 2.5                                                          | 1250                                                                                           | 135                                                 | FD 09        | 300                       | —     | 400                                                          | 1450                                                                                             | 175  |              |                           |                                                              |                                                                                                  |      |                     |                           |                                                              |                                                                                                  |      |    |
| 30                                                                                | BN 200L                                                                           | 4                          | 1460         | 196                  | 91.4                | 91.7  | 0.80                          | 59                               | 7.1                              | 2.7                              | 2.8                                                          | 1650                                                                                           | 157                                                 | FD 09        | 400                       | —     | 300                                                          | 1850                                                                                             | 197  |              |                           |                                                              |                                                                                                  |      |                     |                           |                                                              |                                                                                                  |      |    |



**6 P****1000 min<sup>-1</sup> - S1****50 Hz**

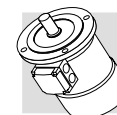
|      |                                                                                   |                   |     |      |       |             |      |     |     |                                        |                                                                                   | freno c.c. / d.c. brake<br>G.S.-bremse / frein c.c. |        |              |                                        |                                                                                     |      | freno c.a. / a.c. brake<br>W.S.-bremse / frein c.a. |        |                  |                                                                                     |      |      |        |                  |                                                                                     |      |      |
|------|-----------------------------------------------------------------------------------|-------------------|-----|------|-------|-------------|------|-----|-----|----------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------|--------|--------------|----------------------------------------|-------------------------------------------------------------------------------------|------|-----------------------------------------------------|--------|------------------|-------------------------------------------------------------------------------------|------|------|--------|------------------|-------------------------------------------------------------------------------------|------|------|
|      |                                                                                   |                   |     |      |       |             |      |     |     |                                        |                                                                                   | FD                                                  |        |              |                                        |                                                                                     | FA   |                                                     |        |                  |                                                                                     | BA   |      |        |                  |                                                                                     |      |      |
| Pn   |  | n                 | Mn  | η    | cos φ | In          | Is   | Ms  | Ma  | Jm                                     | IM B5                                                                             | Mod.                                                | Mb     | Zo           | Jm                                     | IM B5                                                                               | Mod. | Mb                                                  | Zo     | Jm               | IM B5                                                                               | Mod. | Mb   | Zo     | Jm               | IM B5                                                                               |      |      |
| kW   |                                                                                   | min <sup>-1</sup> | Nm  | %    |       | [400V]<br>A | In   | Mn  | Mn  | x 10 <sup>-4</sup><br>kgm <sup>2</sup> |  |                                                     | Nm     | 1/h<br>NB SB | x 10 <sup>-4</sup><br>kgm <sup>2</sup> |  |      | Nm                                                  | 1/h    | kgm <sup>2</sup> |  |      | Nm   | 1/h    | kgm <sup>2</sup> |  |      |      |
| 0.09 | BN 63A                                                                            | 6                 | 880 | 0.98 | 41    | 0.53        | 0.60 | 2.1 | 2.1 | 1.8                                    | 3.4                                                                               | 4.6                                                 | FD 02  | 3.5          | 9000                                   | 14000                                                                               | 4.0  | 6.3                                                 | FA 02  | 3.5              | 14000                                                                               | 4.0  | 6.1  | BA 60  | 5                | 12000                                                                               | 5.4  | 6.9  |
| 0.12 | BN 63B                                                                            | 6                 | 870 | 1.32 | 45    | 0.60        | 0.64 | 2.1 | 1.9 | 1.7                                    | 3.7                                                                               | 4.9                                                 | FD 02  | 3.5          | 9000                                   | 14000                                                                               | 4.3  | 6.6                                                 | FA 02  | 3.5              | 14000                                                                               | 4.3  | 6.4  | BA 60  | 5                | 12000                                                                               | 5.7  | 7.2  |
| 0.18 | BN 71A                                                                            | 6                 | 900 | 1.91 | 56    | 0.69        | 0.67 | 2.6 | 1.9 | 1.7                                    | 8.4                                                                               | 5.5                                                 | FD 03  | 5.0          | 8100                                   | 13500                                                                               | 9.5  | 8.2                                                 | FA 03  | 5.0              | 13500                                                                               | 9.5  | 7.9  | BA 70  | 8                | 12300                                                                               | 10.4 | 9.4  |
| 0.25 | BN 71B                                                                            | 6                 | 900 | 2.7  | 62    | 0.71        | 0.82 | 2.6 | 1.9 | 1.7                                    | 10.9                                                                              | 6.7                                                 | FD 03  | 5.0          | 7800                                   | 13000                                                                               | 12   | 9.4                                                 | FA 03  | 5.0              | 13000                                                                               | 12   | 9.1  | BA 70  | 8                | 12000                                                                               | 12.9 | 10.6 |
| 0.37 | BN 71C                                                                            | 6                 | 910 | 3.9  | 66    | 0.69        | 1.17 | 3   | 2.4 | 2.0                                    | 12.9                                                                              | 7.7                                                 | FD 53  | 7.5          | 5100                                   | 9500                                                                                | 14   | 10.4                                                | FA 03  | 7.5              | 9500                                                                                | 14   | 10.1 | BA 70  | 8                | 8900                                                                                | 14.9 | 11.6 |
| 0.37 | BN 80A                                                                            | 6                 | 910 | 3.9  | 68    | 0.68        | 1.15 | 3.2 | 2.2 | 2.0                                    | 21                                                                                | 9.9                                                 | FD 04  | 10           | 5200                                   | 8500                                                                                | 23   | 13.8                                                | FA 04  | 10               | 8500                                                                                | 23   | 13.7 | BA 80  | 18               | 8000                                                                                | 24   | 15.2 |
| 0.55 | BN 80B                                                                            | 6                 | 920 | 5.7  | 70    | 0.69        | 1.64 | 3.9 | 2.6 | 2.2                                    | 25                                                                                | 11.3                                                | FD 04  | 15           | 4800                                   | 7200                                                                                | 27   | 15.2                                                | FA 04  | 15               | 7200                                                                                | 27   | 15.1 | BA 80  | 18               | 6800                                                                                | 28   | 16.6 |
| 0.75 | BN 80C                                                                            | 6                 | 920 | 7.8  | 70    | 0.65        | 2.38 | 3.8 | 2.5 | 2.2                                    | 28                                                                                | 12.2                                                | FD 04  | 15           | 3400                                   | 6400                                                                                | 30   | 16.1                                                | FA 04  | 15               | 6400                                                                                | 30   | 16.0 | BA 80  | 18               | 6100                                                                                | 31   | 17.5 |
| 0.75 | BN 90S                                                                            | 6                 | 920 | 7.8  | 69    | 0.68        | 2.31 | 3.8 | 2.4 | 2.2                                    | 26                                                                                | 12.6                                                | FD 14  | 15           | 3400                                   | 6500                                                                                | 28   | 16.8                                                | FA 14  | 15               | 6500                                                                                | 28   | 16.7 | BA 90  | 35               | 5500                                                                                | 33   | 19.9 |
| 1.1  | BN 90L                                                                            | 6                 | 920 | 11.4 | 72    | 0.69        | 3.2  | 3.9 | 2.3 | 2.0                                    | 33                                                                                | 15                                                  | FD 05  | 26           | 2700                                   | 5000                                                                                | 37   | 21                                                  | FA 05  | 26               | 5000                                                                                | 37   | 22   | BA 90  | 35               | 4600                                                                                | 40   | 22   |
| 1.5  | BN 100LA                                                                          | 6                 | 940 | 15.2 | 73    | 0.72        | 4.1  | 4   | 2.1 | 2.0                                    | 82                                                                                | 22                                                  | FD 15  | 40           | 1900                                   | 4100                                                                                | 86   | 28                                                  | FA 15  | 40               | 4100                                                                                | 86   | 29   | BA 100 | 50               | 3800                                                                                | 94   | 32   |
| 1.85 | BN 100LB                                                                          | 6                 | 930 | 19.0 | 75    | 0.73        | 4.9  | 4.5 | 2.1 | 2.0                                    | 95                                                                                | 24                                                  | FD 15  | 40           | 1700                                   | 3600                                                                                | 99   | 30                                                  | FA 15  | 40               | 3600                                                                                | 99   | 31   | BA 100 | 50               | 3400                                                                                | 107  | 34   |
| 2.2  | BN 112M                                                                           | 6                 | 940 | 22   | 78    | 0.73        | 5.6  | 4.8 | 2.2 | 2.0                                    | 168                                                                               | 32                                                  | FD 06S | 60           | —                                      | 2100                                                                                | 177  | 42                                                  | FA 06S | 60               | 2100                                                                                | 177  | 44   | BA 110 | 75               | 2000                                                                                | 184  | 45   |
| 3    | BN 132S                                                                           | 6                 | 940 | 30   | 76    | 0.76        | 7.5  | 4.8 | 1.9 | 1.8                                    | 216                                                                               | 36                                                  | FD 56  | 75           | —                                      | 1400                                                                                | 226  | 49                                                  | FA 06  | 75               | 1400                                                                                | 226  | 50   | BA 140 | 150              | 1200                                                                                | 266  | 68   |
| 4    | BN 132MA                                                                          | 6                 | 950 | 40   | 78    | 0.77        | 9.6  | 5.5 | 2.0 | 1.8                                    | 295                                                                               | 45                                                  | FD 06  | 100          | —                                      | 1200                                                                                | 305  | 58                                                  | FA 07  | 100              | 1200                                                                                | 318  | 63   | BA 140 | 150              | 1050                                                                                | 345  | 77   |
| 5.5  | BN 132MB                                                                          | 6                 | 945 | 56   | 80    | 0.78        | 12.7 | 5.9 | 2.1 | 1.9                                    | 383                                                                               | 56                                                  | FD 07  | 150          | —                                      | 1050                                                                                | 406  | 72                                                  | FA 07  | 150              | 1050                                                                                | 406  | 74   | BA 140 | 150              | 1000                                                                                | 433  | 88   |
| 7.5  | BN 160M                                                                           | 6                 | 955 | 75   | 84    | 0.81        | 15.9 | 5.9 | 2.2 | 2.0                                    | 740                                                                               | 83                                                  | FD 08  | 170          | —                                      | 900                                                                                 | 815  | 112                                                 | FA 08  | 170              | 900                                                                                 | 815  | 113  |        |                  |                                                                                     |      |      |
| 11   | BN 160L                                                                           | 6                 | 960 | 109  | 87    | 0.81        | 22.5 | 6.5 | 2.5 | 2.3                                    | 970                                                                               | 103                                                 | FD 08  | 200          | —                                      | 800                                                                                 | 1045 | 133                                                 | FA 08  | 200              | 800                                                                                 | 1045 | 133  |        |                  |                                                                                     |      |      |
| 15   | BN 180L                                                                           | 6                 | 970 | 148  | 88    | 0.82        | 30   | 6.2 | 2.0 | 2.4                                    | 1550                                                                              | 130                                                 | FD 09  | 300          | —                                      | 600                                                                                 | 1750 | 170                                                 |        |                  |                                                                                     |      |      |        |                  |                                                                                     |      |      |
| 18.5 | BN 200LA                                                                          | 6                 | 960 | 184  | 88    | 0.81        | 37   | 5.9 | 2.0 | 2.3                                    | 1700                                                                              | 145                                                 | FD 09  | 400          | —                                      | 450                                                                                 | 1900 | 185                                                 |        |                  |                                                                                     |      |      |        |                  |                                                                                     |      |      |

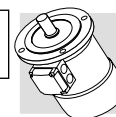
8 P

750 min<sup>-1</sup> - S1

50 Hz

|          |                                                                                   |                        |          |        |                      |                     |                     |                      |                      |                                                          |                                                                                            | freno c.c. / d.c. brake<br>G.S.-bremse / frein c.c. |          |                                |       |                                                          |                                                                                              | freno c.a. / a.c. brake<br>W.S.-bremse / frein c.a. |          |                       |                                                          |                                                                                              |               |                 |                       |                                                          |                                                                                              |
|----------|-----------------------------------------------------------------------------------|------------------------|----------|--------|----------------------|---------------------|---------------------|----------------------|----------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------|----------|--------------------------------|-------|----------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------|----------|-----------------------|----------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------|-----------------|-----------------------|----------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Pn<br>kW |  | n<br>min <sup>-1</sup> | Mn<br>Nm | η<br>% | cos φ<br>[400V]<br>A | I <sub>n</sub><br>A | I <sub>s</sub><br>A | M <sub>s</sub><br>Nm | M <sub>a</sub><br>Nm | J <sub>m</sub><br>x 10 <sup>-4</sup><br>kgm <sup>2</sup> | IM B5<br> | FD                                                  |          |                                |       |                                                          |                                                                                              | FA                                                  |          |                       |                                                          |                                                                                              | BA            |                 |                       |                                                          |                                                                                              |
|          |                                                                                   |                        |          |        |                      |                     |                     |                      |                      |                                                          |                                                                                            | Mod.                                                | Mb<br>Nm | Z <sub>o</sub><br>1/h<br>NB SB |       | J <sub>m</sub><br>x 10 <sup>-4</sup><br>kgm <sup>2</sup> | IM B5<br> | Mod.                                                | Mb<br>Nm | Z <sub>o</sub><br>1/h | J <sub>m</sub><br>x 10 <sup>-4</sup><br>kgm <sup>2</sup> | IM B5<br> | Mod.          | Mb<br>max<br>Nm | Z <sub>o</sub><br>1/h | J <sub>m</sub><br>x 10 <sup>-4</sup><br>kgm <sup>2</sup> | IM B5<br> |
| 0.09     | <b>BN 71A</b>                                                                     | <b>8</b>               | 680      | 1.26   | 47                   | 0.59                | 0.47                | 2.3                  | 2.4                  | 2.3                                                      | 10.9                                                                                       | <b>FD 03</b>                                        | 3.5      | 9000                           | 16000 | 12.0                                                     | 9.4                                                                                          | <b>FA 03</b>                                        | 3.5      | 16000                 | 12.0                                                     | 9.1                                                                                          | <b>BA 70</b>  | 8.0             | 14000                 | 12.9                                                     | 10.6                                                                                         |
| 0.12     | <b>BN 71B</b>                                                                     | <b>8</b>               | 680      | 1.69   | 51                   | 0.59                | 0.58                | 2.1                  | 2.3                  | 2.2                                                      | 12.9                                                                                       | <b>FD 03</b>                                        | 5.0      | 9000                           | 16000 | 14.0                                                     | 10.4                                                                                         | <b>FA 03</b>                                        | 5.0      | 16000                 | 14.0                                                     | 10.1                                                                                         | <b>BA 70</b>  | 8.0             | 14000                 | 14.9                                                     | 11.6                                                                                         |
| 0.18     | <b>BN 80A</b>                                                                     | <b>8</b>               | 690      | 2.49   | 51                   | 0.60                | 0.85                | 2.4                  | 2.2                  | 2.2                                                      | 15                                                                                         | <b>FD 04</b>                                        | 5.0      | 6500                           | 11000 | 16.6                                                     | 12.1                                                                                         | <b>FA 04</b>                                        | 5.0      | 11000                 | 16.6                                                     | 12.0                                                                                         | <b>BA 80</b>  | 18.0            | 10000                 | —                                                        | —                                                                                            |
| 0.25     | <b>BN 80B</b>                                                                     | <b>8</b>               | 680      | 3.51   | 54                   | 0.63                | 1.06                | 2.4                  | 2.0                  | 1.9                                                      | 20                                                                                         | <b>FD 04</b>                                        | 10.0     | 6000                           | 10000 | 22                                                       | 13.8                                                                                         | <b>FA 04</b>                                        | 10.0     | 10000                 | 23                                                       | 13.7                                                                                         | <b>BA 80</b>  | 18.0            | 9500                  | 24                                                       | 15.2                                                                                         |
| 0.37     | <b>BN 90S</b>                                                                     | <b>8</b>               | 675      | 5.2    | 58                   | 0.60                | 1.53                | 2.6                  | 2.3                  | 2.1                                                      | 26                                                                                         | <b>FD 14</b>                                        | 15.0     | 4800                           | 7500  | 28                                                       | 16.8                                                                                         | <b>FA 14</b>                                        | 15.0     | 7500                  | 28                                                       | 16.7                                                                                         | <b>BA 90</b>  | 35              | 6800                  | 33                                                       | 19.9                                                                                         |
| 0.55     | <b>BN 90L</b>                                                                     | <b>8</b>               | 670      | 7.8    | 62                   | 0.60                | 2.13                | 2.6                  | 2.2                  | 2.0                                                      | 33                                                                                         | <b>FD 05</b>                                        | 26       | 4000                           | 6400  | 37                                                       | 21                                                                                           | <b>FA 05</b>                                        | 26       | 6400                  | 37                                                       | 22                                                                                           | <b>BA 90</b>  | 35              | 6000                  | 40                                                       | 22                                                                                           |
| 0.75     | <b>BN 100LA</b>                                                                   | <b>8</b>               | 700      | 10.2   | 68                   | 0.63                | 2.53                | 3.4                  | 1.9                  | 1.7                                                      | 82                                                                                         | <b>FD 15</b>                                        | 26       | 2800                           | 4800  | 86                                                       | 28                                                                                           | <b>FA 15</b>                                        | 26       | 4800                  | 86                                                       | 29                                                                                           | <b>BA 100</b> | 50              | 4500                  | 94                                                       | 32                                                                                           |
| 1.1      | <b>BN 100LB</b>                                                                   | <b>8</b>               | 700      | 15.0   | 68                   | 0.64                | 3.65                | 3.2                  | 1.7                  | 1.7                                                      | 95                                                                                         | <b>FD 15</b>                                        | 40       | 2500                           | 4000  | 99                                                       | 30                                                                                           | <b>FA 15</b>                                        | 40       | 4000                  | 99                                                       | 31                                                                                           | <b>BA 100</b> | 50              | 3700                  | 107                                                      | 34                                                                                           |
| 1.5      | <b>BN 112M</b>                                                                    | <b>8</b>               | 710      | 20.2   | 71                   | 0.66                | 4.6                 | 3.7                  | 1.8                  | 1.9                                                      | 168                                                                                        | <b>FD 06S</b>                                       | 60       | —                              | 3000  | 177                                                      | 42                                                                                           | <b>FA 06S</b>                                       | 60       | 3000                  | 177                                                      | 44                                                                                           | <b>BA 110</b> | 75              | 2700                  | 184                                                      | 45                                                                                           |
| 2.2      | <b>BN 132S</b>                                                                    | <b>8</b>               | 710      | 29.6   | 75                   | 0.66                | 6.4                 | 3.8                  | 1.8                  | 2.0                                                      | 295                                                                                        | <b>FD 56</b>                                        | 75       | —                              | 2300  | 305                                                      | 58                                                                                           | <b>FA 06</b>                                        | 75       | 2300                  | 305                                                      | 56                                                                                           | <b>BA 140</b> | 150             | 2000                  | 345                                                      | 77                                                                                           |
| 3        | <b>BN 132MA</b>                                                                   | <b>8</b>               | 710      | 40.4   | 76                   | 0.69                | 8.3                 | 3.9                  | 1.8                  | 370                                                      | 53                                                                                         | <b>FD 06</b>                                        | 100      | —                              | 1900  | 394                                                      | 69                                                                                           | <b>FA 07</b>                                        | 100      | 1900                  | 406                                                      | 74                                                                                           | <b>BA 140</b> | 150             | 1700                  | 433                                                      | 88                                                                                           |



**2/4 P****3000/1500 min<sup>-1</sup> - S1****50 Hz**

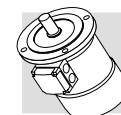
|              |                                                                                   |                        |              |              |          |                   |              |            |            |                                              |                                                                                            | freno c.c. / d.c. brake<br>G.S.-bremse / frein c.c. |          |                    |                                              |                                                                                              | freno c.a. / a.c. brake<br>W.S.-bremse / frein c.a. |          |              |                                              |                                                                                              |        |                 |              |                                              |                                                                                              |
|--------------|-----------------------------------------------------------------------------------|------------------------|--------------|--------------|----------|-------------------|--------------|------------|------------|----------------------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------|----------|--------------------|----------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------|----------|--------------|----------------------------------------------|----------------------------------------------------------------------------------------------|--------|-----------------|--------------|----------------------------------------------|----------------------------------------------------------------------------------------------|
| Pn<br>kW     |  | n<br>min <sup>-1</sup> | Mn<br>Nm     | η<br>%       | cos φ    | In<br>[400V]<br>A | Is<br>In     | Ms<br>Mn   | Ma<br>Mn   | Jm<br>x 10 <sup>-4</sup><br>kgm <sup>2</sup> | IM B5<br> | FD                                                  |          |                    |                                              |                                                                                              | FA                                                  |          |              |                                              |                                                                                              | BA     |                 |              |                                              |                                                                                              |
|              |                                                                                   |                        |              |              |          |                   |              |            |            |                                              |                                                                                            | Mod.                                                | Mb<br>Nm | Zo<br>1/h<br>NB SB | Jm<br>x 10 <sup>-4</sup><br>kgm <sup>2</sup> | IM B5<br> | Mod.                                                | Mb<br>Nm | Zo<br>1/h    | Jm<br>x 10 <sup>-4</sup><br>kgm <sup>2</sup> | IM B5<br> | Mod.   | Mb<br>max<br>Nm | Zo<br>1/h    | Jm<br>x 10 <sup>-4</sup><br>kgm <sup>2</sup> | IM B5<br> |
| 0.20<br>0.15 | BN 63B                                                                            | 2<br>4                 | 2700<br>1350 | 0.71<br>1.06 | 55<br>49 | 0.82<br>0.67      | 0.64<br>0.66 | 3.5<br>2.6 | 2.1<br>1.8 | 1.9<br>1.7                                   | 2.9<br>4.4                                                                                 | FD 02                                               | 3.5      | 2200<br>4000       | 2600<br>5100                                 | 3.5<br>6.1                                                                                   | FA 02                                               | 3.5      | 2600<br>5100 | 3.5                                          | 5.9                                                                                          | BA 60  | 5               | 2000<br>4000 | 4.9                                          | 6.7                                                                                          |
| 0.28<br>0.20 | BN 71A                                                                            | 2<br>4                 | 2700<br>1370 | 0.99<br>1.39 | 56<br>59 | 0.82<br>0.72      | 0.88<br>0.68 | 2.9<br>3.1 | 1.9<br>1.8 | 1.7<br>1.7                                   | 4.7<br>4.4                                                                                 | FD 03                                               | 3.5      | 2100<br>3800       | 2400<br>4800                                 | 5.8<br>7.1                                                                                   | FA 03                                               | 3.5      | 2400<br>4800 | 5.8                                          | 6.8                                                                                          | BA 70  | 8               | 2100<br>4200 | 5.6                                          | 8.3                                                                                          |
| 0.37<br>0.25 | BN 71B                                                                            | 2<br>4                 | 2740<br>1390 | 1.29<br>1.72 | 56<br>60 | 0.82<br>0.73      | 1.16<br>0.82 | 3.5<br>3.3 | 1.8<br>2.0 | 1.8<br>1.9                                   | 5.8<br>5.1                                                                                 | FD 03                                               | 5        | 1400<br>2900       | 2100<br>4200                                 | 6.9<br>7.8                                                                                   | FA 03                                               | 5        | 2100<br>4200 | 6.9                                          | 7.5                                                                                          | BA 70  | 8               | 1800<br>3600 | 7.8                                          | 9.0                                                                                          |
| 0.45<br>0.30 | BN 71C                                                                            | 2<br>4                 | 2780<br>1400 | 1.55<br>2.0  | 63<br>63 | 0.85<br>0.73      | 1.21<br>0.94 | 3.8<br>3.6 | 1.8<br>2.0 | 1.8<br>1.9                                   | 6.9<br>5.9                                                                                 | FD 03                                               | 5        | 1400<br>2900       | 2100<br>4200                                 | 8.0<br>8.6                                                                                   | FA 03                                               | 5        | 2100<br>4200 | 8.0                                          | 8.3                                                                                          | BA 70  | 8               | 1800<br>3600 | 8.9                                          | 9.8                                                                                          |
| 0.55<br>0.37 | BN 80A                                                                            | 2<br>4                 | 2800<br>1400 | 1.9<br>2.5   | 63<br>67 | 0.85<br>0.79      | 1.48<br>1.01 | 3.9<br>4.1 | 1.7<br>1.8 | 1.7<br>1.9                                   | 15<br>8.2                                                                                  | FD 04                                               | 5        | 1600<br>3000       | 2300<br>4000                                 | 16.6<br>12.1                                                                                 | FA 04                                               | 5        | 2300<br>4000 | 16.6                                         | 12.0                                                                                         | BA 80  | 18              | 2100<br>3700 | 18                                           | 13.5                                                                                         |
| 0.75<br>0.55 | BN 80B                                                                            | 2<br>4                 | 2780<br>1400 | 2.6<br>3.8   | 65<br>68 | 0.85<br>0.81      | 1.96<br>1.44 | 3.8<br>3.9 | 1.9<br>1.7 | 1.8<br>1.7                                   | 20<br>9.9                                                                                  | FD 04                                               | 10       | 1400<br>2700       | 1600<br>3600                                 | 22<br>13.8                                                                                   | FA 04                                               | 10       | 1600<br>3600 | 22                                           | 13.7                                                                                         | BA 80  | 18              | 1500<br>3300 | 22                                           | 15.2                                                                                         |
| 1.1<br>0.75  | BN 90S                                                                            | 2<br>4                 | 2790<br>1390 | 3.8<br>5.2   | 71<br>66 | 0.82<br>0.79      | 2.73<br>2.08 | 4.7<br>4.6 | 2.3<br>2.4 | 2.0<br>2.2                                   | 21<br>12.2                                                                                 | FD 14                                               | 10       | 1500<br>2300       | 1600<br>2800                                 | 23<br>16.4                                                                                   | FA 14                                               | 10       | 1600<br>2800 | 23                                           | 16.3                                                                                         | BA 90  | 35              | 1300<br>2300 | 28                                           | 19.5                                                                                         |
| 1.5<br>1.1   | BN 90L                                                                            | 2<br>4                 | 2780<br>1390 | 5.2<br>7.6   | 70<br>73 | 0.85<br>0.81      | 3.64<br>2.69 | 4.5<br>4.7 | 2.4<br>2.5 | 2.1<br>2.2                                   | 28<br>14.0                                                                                 | FD 05                                               | 26       | 1050<br>1600       | 1200<br>2000                                 | 32<br>20                                                                                     | FA 05                                               | 26       | 1200<br>2000 | 32                                           | 21                                                                                           | BA 90  | 35              | 1100<br>1800 | 35                                           | 21                                                                                           |
| 2.2<br>1.5   | BN 100LA                                                                          | 2<br>4                 | 2800<br>1410 | 7.5<br>10.2  | 72<br>73 | 0.85<br>0.79      | 5.2<br>3.8   | 4.5<br>4.7 | 2.0<br>2.0 | 1.9<br>2.0                                   | 40<br>18.3                                                                                 | FD 15                                               | 26       | 600<br>1300        | 900<br>2300                                  | 44<br>25                                                                                     | FA 15                                               | 26       | 900<br>2300  | 44                                           | 25                                                                                           | BA 100 | 50              | 750<br>1900  | 51                                           | 29                                                                                           |
| 3.5<br>2.5   | BN 100LB                                                                          | 2<br>4                 | 2850<br>1420 | 11.7<br>16.8 | 80<br>82 | 0.84<br>0.80      | 7.5<br>5.5   | 5.4<br>5.2 | 2.2<br>2.2 | 2.1<br>2.2                                   | 61<br>25                                                                                   | FD 15                                               | 40       | 500<br>1000        | 900<br>2100                                  | 65<br>31                                                                                     | FA 15                                               | 40       | 900<br>2100  | 65                                           | 32                                                                                           | BA 100 | 50              | 750<br>1800  | 72                                           | 35                                                                                           |
| 4<br>3.3     | BN 112M                                                                           | 2<br>4                 | 2880<br>1420 | 13.3<br>22.2 | 79<br>80 | 0.83<br>0.80      | 8.8<br>7.4   | 6.1<br>5.1 | 2.4<br>2.1 | 2.0<br>2.0                                   | 98<br>30                                                                                   | FD 06S                                              | 60       | —<br>—             | 700<br>1200                                  | 107<br>40                                                                                    | FA 06S                                              | 60       | 700<br>1200  | 107<br>42                                    | 42                                                                                           | BA 110 | 75              | 600<br>1100  | 114                                          | 43                                                                                           |
| 5.5<br>4.4   | BN 132S                                                                           | 2<br>4                 | 2890<br>1440 | 18.2<br>29   | 80<br>82 | 0.87<br>0.84      | 11.4<br>9.2  | 5.9<br>5.3 | 2.4<br>2.2 | 2.0<br>2.0                                   | 213<br>44                                                                                  | FD 56                                               | 75       | —<br>—             | 350<br>900                                   | 223<br>57                                                                                    | FA 06                                               | 75       | 350<br>900   | 223<br>58                                    | 58                                                                                           | BA 140 | 150             | 300<br>750   | 263                                          | 76                                                                                           |
| 7.5<br>6     | BN 132MA                                                                          | 2<br>4                 | 2900<br>1430 | 25<br>40     | 82<br>84 | 0.87<br>0.85      | 15.2<br>12.1 | 6.5<br>5.8 | 2.4<br>2.3 | 2.0<br>2.1                                   | 270<br>53                                                                                  | FD 06                                               | 100      | —<br>—             | 350<br>900                                   | 280<br>66                                                                                    | FA 07                                               | 100      | 350<br>900   | 293<br>71                                    | 71                                                                                           | BA 140 | 150             | 300<br>800   | 320                                          | 85                                                                                           |
| 9.2<br>7.3   | BN 132MB                                                                          | 2<br>4                 | 2920<br>1440 | 30<br>48     | 83<br>85 | 0.86<br>0.85      | 18.6<br>14.6 | 6.0<br>5.5 | 2.6<br>2.3 | 2.2<br>2.1                                   | 319<br>59                                                                                  | FD 07                                               | 150      | —<br>—             | 300<br>800                                   | 342<br>75                                                                                    | FA 07                                               | 150      | 300<br>800   | 342<br>77                                    | 77                                                                                           | BA 140 | 150             | 300<br>750   | 369                                          | 91                                                                                           |

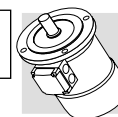
2/6 P

3000/1000 min<sup>-1</sup> - S3 60/40%

50 Hz

|              |                                                                                   |        |                   |              |          |              |              |            |            |            |                                        | freno c.c. / d.c. brake<br>G.S.-bremse / frein c.c.                               |        |      |               |               | freno c.a. / a.c. brake<br>W.S.-bremse / frein c.a. |                                                                                     |        |     |               |                  |                                                                                     |        |     |               |                  |                                                                                     |
|--------------|-----------------------------------------------------------------------------------|--------|-------------------|--------------|----------|--------------|--------------|------------|------------|------------|----------------------------------------|-----------------------------------------------------------------------------------|--------|------|---------------|---------------|-----------------------------------------------------|-------------------------------------------------------------------------------------|--------|-----|---------------|------------------|-------------------------------------------------------------------------------------|--------|-----|---------------|------------------|-------------------------------------------------------------------------------------|
|              |                                                                                   |        |                   |              |          |              |              |            |            |            |                                        | FD                                                                                |        |      |               |               | FA                                                  |                                                                                     |        |     |               | BA               |                                                                                     |        |     |               |                  |                                                                                     |
| Pn           |  |        | n                 | Mn           | η        | cos φ        | In           | Is         | Ms         | Ma         | Jm                                     | IM B5                                                                             | Mod.   | Mb   | Zo            |               | Jm                                                  | IM B5                                                                               | Mod.   | Mb  | Zo            | Jm               | IM B5                                                                               | Mod.   | Mb  | Zo            | Jm               | IM B5                                                                               |
| kW           |                                                                                   |        | min <sup>-1</sup> | Nm           | %        |              | [400V]<br>A  | ln         | Mn         | Mn         | x 10 <sup>-4</sup><br>kgm <sup>2</sup> |  |        | Nm   | 1/h<br>NB SB  |               | x 10 <sup>-4</sup><br>kgm <sup>2</sup>              |  |        | Nm  | 1/h           | kgm <sup>2</sup> |  |        | Nm  | 1/h           | kgm <sup>2</sup> |  |
| 0.25<br>0.08 | BN 71A                                                                            | 2<br>6 | 2850<br>910       | 0.84<br>0.84 | 60<br>43 | 0.82<br>0.70 | 0.73<br>0.38 | 4.3<br>2.1 | 1.9<br>1.4 | 1.8<br>1.5 | 6.9<br>5.9                             | 5.9                                                                               | FD 03  | 1.75 | 1500<br>10000 | 1700<br>13000 | 8.0<br>8.6                                          | 8.6                                                                                 | FA 03  | 2.5 | 1700<br>13000 | 8.0<br>8.3       | 8.3                                                                                 | BA 70  | 8   | 1500<br>11000 | 8.9<br>9.8       | 9.8                                                                                 |
| 0.37<br>0.12 | BN 71B                                                                            | 2<br>6 | 2880<br>900       | 1.23<br>1.27 | 62<br>44 | 0.80<br>0.73 | 1.08<br>0.54 | 4.4<br>2.4 | 1.9<br>1.4 | 1.8<br>1.5 | 9.1<br>7.3                             | 7.3                                                                               | FD 03  | 3.5  | 1000<br>9000  | 1300<br>11000 | 10.2<br>10.0                                        | 10.0                                                                                | FA 03  | 3.5 | 1300<br>11000 | 10.2<br>9.7      | 9.7                                                                                 | BA 70  | 8   | 1200<br>10000 | 11.1<br>11.2     | 11.2                                                                                |
| 0.55<br>0.18 | BN 80A                                                                            | 2<br>6 | 2800<br>930       | 1.88<br>1.85 | 63<br>52 | 0.86<br>0.65 | 1.47<br>0.77 | 4.5<br>3.3 | 1.9<br>2   | 1.7<br>1.9 | 20<br>9.9                              | 9.9                                                                               | FD 04  | 5    | 1500<br>4100  | 1800<br>6300  | 22<br>13.8                                          | 13.8                                                                                | FA 04  | 5   | 1800<br>6300  | 22<br>13.7       | 13.7                                                                                | BA 80  | 18  | 1700<br>6000  | 23<br>15.2       | 15.2                                                                                |
| 0.75<br>0.25 | BN 80B                                                                            | 2<br>6 | 2800<br>930       | 2.6<br>2.6   | 66<br>54 | 0.87<br>0.67 | 1.89<br>1.00 | 4.3<br>3.2 | 1.8<br>1.7 | 1.6<br>1.8 | 25<br>11.3                             | 11.3                                                                              | FD 04  | 5    | 1700<br>3800  | 1900<br>6000  | 27<br>15.2                                          | 15.2                                                                                | FA 04  | 5   | 1900<br>6000  | 27<br>15.1       | 15.1                                                                                | BA 80  | 18  | 1800<br>5600  | 28<br>16.6       | 16.6                                                                                |
| 1.1<br>0.37  | BN 90L                                                                            | 2<br>6 | 2860<br>920       | 3.7<br>3.8   | 67<br>59 | 0.84<br>0.71 | 2.82<br>1.27 | 4.7<br>3.3 | 2.1<br>1.6 | 1.9<br>1.6 | 28<br>14.0                             | 14.0                                                                              | FD 05  | 13   | 1400<br>3400  | 1600<br>5200  | 32<br>20                                            | 20                                                                                  | FA 05  | 13  | 1600<br>5200  | 32<br>21         | 21                                                                                  | BA 90  | 35  | 1500<br>4700  | 35<br>21         | 21                                                                                  |
| 1.5<br>0.55  | BN 100LA                                                                          | 2<br>6 | 2880<br>940       | 5.0<br>5.6   | 73<br>64 | 0.84<br>0.67 | 3.53<br>1.85 | 5.1<br>3.5 | 1.9<br>1.7 | 2.0<br>1.8 | 40<br>18.3                             | 18.3                                                                              | FD 15  | 13   | 1000<br>2900  | 1200<br>4000  | 44<br>24                                            | 24                                                                                  | FA 15  | 13  | 1200<br>4000  | 44<br>25         | 25                                                                                  | BA 100 | 50  | 1050<br>3500  | 51<br>29         | 29                                                                                  |
| 2.2<br>0.75  | BN 100LB                                                                          | 2<br>6 | 2900<br>950       | 7.2<br>7.5   | 77<br>67 | 0.85<br>0.64 | 4.9<br>2.5   | 5.9<br>3.3 | 2.0<br>1.9 | 2.0<br>1.8 | 61<br>25                               | 25                                                                                | FD 15  | 26   | 700<br>2100   | 900<br>3000   | 65<br>31                                            | 31                                                                                  | FA 15  | 26  | 900<br>3000   | 65<br>32         | 32                                                                                  | BA 100 | 50  | 800<br>2700   | 72<br>36         | 36                                                                                  |
| 3<br>1.1     | BN 112M                                                                           | 2<br>6 | 2900<br>950       | 9.9<br>11.1  | 78<br>72 | 0.87<br>0.64 | 6.4<br>3.4   | 6.3<br>3.9 | 2.0<br>1.8 | 2.1<br>1.8 | 98<br>30                               | 30                                                                                | FD 06S | 40   | —<br>—        | 1000<br>2600  | 107<br>40                                           | 40                                                                                  | FA 06S | 40  | 1000<br>2600  | 107<br>32        | 32                                                                                  | BA 110 | 75  | 930<br>2400   | 114<br>43        | 43                                                                                  |
| 4.5<br>1.5   | BN 132S                                                                           | 2<br>6 | 2910<br>960       | 14.8<br>14.9 | 78<br>74 | 0.84<br>0.67 | 9.9<br>4.4   | 5.8<br>4.2 | 1.9<br>1.9 | 1.8<br>2.0 | 213<br>44                              | 44                                                                                | FD 56  | 37   | —<br>—        | 500<br>2100   | 223<br>57                                           | 57                                                                                  | FA 06  | 37  | 500<br>2100   | 223<br>58        | 58                                                                                  | BA 140 | 150 | 400<br>1700   | 263<br>76        | 76                                                                                  |
| 5.5<br>2.2   | BN 132M                                                                           | 2<br>6 | 2920<br>960       | 18.0<br>22   | 78<br>77 | 0.87<br>0.71 | 11.7<br>5.8  | 6.2<br>4.3 | 2.1<br>2.1 | 1.9<br>2.0 | 270<br>53                              | 53                                                                                | FD 56  | 50   | —<br>—        | 400<br>1900   | 280<br>66                                           | 66                                                                                  | FA 06  | 50  | 400<br>1900   | 280<br>67        | 67                                                                                  | BA 140 | 150 | 350<br>1600   | 320<br>85        | 85                                                                                  |



**2/8 P****3000/750 min<sup>-1</sup> - S3 60/40%****50 Hz**

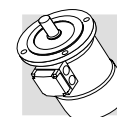
|              |                                                                                   |                   |             |              |          |              |              |            |            |                          |                                                                                            | freno c.c. / d.c. brake<br>G.S.-bremse / frein c.c. |      |               |                          |                                                                                              |                                                                                     | freno c.a. / a.c. brake<br>W.S.-bremse / frein c.a. |               |                          |                                                                                              |                                                                                     |               |              |                          |                                                                                              |                                                                                     |
|--------------|-----------------------------------------------------------------------------------|-------------------|-------------|--------------|----------|--------------|--------------|------------|------------|--------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------|------|---------------|--------------------------|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------|---------------|--------------------------|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------|--------------|--------------------------|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|              |                                                                                   |                   |             |              |          |              |              |            |            |                          |                                                                                            | FD                                                  |      |               |                          |                                                                                              |                                                                                     | FA                                                  |               |                          |                                                                                              |                                                                                     | BA            |              |                          |                                                                                              |                                                                                     |
| Pn           |  | n                 | Mn          | η            | cos φ    | In           | Is           | Ms         | Ma         | Jm<br>x 10 <sup>-4</sup> | IM B5<br> | Mod.                                                | Mb   | Zo            | Jm<br>x 10 <sup>-4</sup> | IM B5<br> | Mod.                                                                                | Mb                                                  | Zo            | Jm<br>x 10 <sup>-4</sup> | IM B5<br> | Mod.                                                                                | Mb<br>max     | Zo           | Jm<br>x 10 <sup>-4</sup> | IM B5<br> |                                                                                     |
| kW           |                                                                                   | min <sup>-1</sup> | Nm          | %            |          | [400V]<br>A  | ln           | Mn         | Ma         | kgm <sup>2</sup>         |           |                                                     | Nm   | NB            | SB                       | kgm <sup>2</sup>                                                                             |  |                                                     | Nm            | 1/h                      | kgm <sup>2</sup>                                                                             |  |               | Nm           | 1/h                      | kgm <sup>2</sup>                                                                             |  |
| 0.25<br>0.06 | BN 71A                                                                            | 2<br>8            | 2790<br>680 | 0.86<br>0.84 | 61<br>31 | 0.87<br>0.61 | 0.68<br>0.46 | 3.9<br>2   | 1.8<br>1.8 | 1.9<br>1.9               | 10.9<br>6.7                                                                                | FD 03                                               | 1.75 | 1300<br>10000 | 1400<br>13000            | 12<br>9.4                                                                                    | FA 03                                                                               | 2.5                                                 | 1400<br>13000 | 12<br>9.1                | BA 70                                                                                        | 8                                                                                   | 1300<br>12000 | 12.9<br>10.6 |                          |                                                                                              |                                                                                     |
| 0.37<br>0.09 | BN 71B                                                                            | 2<br>8            | 2800<br>670 | 1.26<br>1.28 | 63<br>34 | 0.86<br>0.75 | 0.99<br>0.51 | 3.9<br>1.8 | 1.8<br>1.4 | 1.9<br>1.5               | 12.9<br>7.7                                                                                | FD 03                                               | 3.5  | 1200<br>9500  | 1300<br>13000            | 14<br>10.4                                                                                   | FA 03                                                                               | 3.5                                                 | 1300<br>13000 | 14<br>10.1               | BA 70                                                                                        | 8                                                                                   | 1200<br>12000 | 14.9<br>11.6 |                          |                                                                                              |                                                                                     |
| 0.55<br>0.13 | BN 80A                                                                            | 2<br>8            | 2830<br>690 | 1.86<br>1.80 | 66<br>41 | 0.86<br>0.64 | 1.40<br>0.72 | 4.4<br>2.3 | 2.1<br>1.6 | 2.0<br>1.7               | 20<br>9.9                                                                                  | FD 04                                               | 5    | 1500<br>5600  | 1800<br>8000             | 22<br>13.8                                                                                   | FA 04                                                                               | 5                                                   | 1800<br>8000  | 22<br>13.7               | BA 80                                                                                        | 18                                                                                  | 1700<br>7500  | 23<br>15.2   |                          |                                                                                              |                                                                                     |
| 0.75<br>0.18 | BN 80B                                                                            | 2<br>8            | 2800<br>690 | 2.6<br>2.5   | 68<br>43 | 0.88<br>0.66 | 1.81<br>0.92 | 4.6<br>2.3 | 2.1<br>1.6 | 2.0<br>1.7               | 25<br>11.3                                                                                 | FD 04                                               | 10   | 1700<br>4800  | 1900<br>7300             | 27<br>15.2                                                                                   | FA 04                                                                               | 10                                                  | 1900<br>7300  | 27<br>15.1               | BA 80                                                                                        | 18                                                                                  | 1800<br>7000  | 28<br>16.6   |                          |                                                                                              |                                                                                     |
| 1.1<br>0.28  | BN 90L                                                                            | 2<br>8            | 2830<br>690 | 3.7<br>3.9   | 63<br>48 | 0.84<br>0.63 | 3.00<br>1.34 | 4.5<br>2.4 | 2.1<br>1.8 | 1.9<br>1.9               | 28<br>14                                                                                   | FD 05                                               | 13   | 1400<br>3400  | 1600<br>5100             | 32<br>20                                                                                     | FA 05                                                                               | 13                                                  | 1600<br>5100  | 32<br>21                 | BA 90                                                                                        | 35                                                                                  | 1400<br>4500  | 35<br>21     |                          |                                                                                              |                                                                                     |
| 1.5<br>0.37  | BN 100LA                                                                          | 2<br>8            | 2880<br>690 | 5.0<br>5.1   | 69<br>46 | 0.85<br>0.63 | 3.69<br>1.84 | 4.7<br>2.1 | 1.9<br>1.6 | 1.8<br>1.6               | 40<br>18.3                                                                                 | FD 15                                               | 13   | 1000<br>3300  | 1200<br>5000             | 44<br>25                                                                                     | FA 15                                                                               | 13                                                  | 1200<br>5000  | 44<br>25                 | BA 100                                                                                       | 50                                                                                  | 1000<br>4200  | 52<br>29     |                          |                                                                                              |                                                                                     |
| 2.4<br>0.55  | BN 100LB                                                                          | 2<br>8            | 2900<br>700 | 7.9<br>7.5   | 75<br>54 | 0.82<br>0.58 | 5.6<br>2.5   | 5.4<br>2.6 | 2.1<br>1.8 | 2.0<br>1.8               | 61<br>25                                                                                   | FD 15                                               | 26   | 550<br>2000   | 700<br>3500              | 65<br>31                                                                                     | FA 15                                                                               | 26                                                  | 700<br>3500   | 65<br>32                 | BA 100                                                                                       | 50                                                                                  | 600<br>3100   | 72<br>36     |                          |                                                                                              |                                                                                     |
| 3<br>0.75    | BN 112M                                                                           | 2<br>8            | 2900<br>690 | 9.9<br>10.4  | 76<br>60 | 0.87<br>0.65 | 6.5<br>2.8   | 6.3<br>2.5 | 2.1<br>1.6 | 1.9<br>1.6               | 98<br>30                                                                                   | FD 06S                                              | 40   | —<br>—        | 900<br>2900              | 107<br>40                                                                                    | FA 06S                                                                              | 40                                                  | 900<br>2900   | 107<br>42                | BA 110                                                                                       | 75                                                                                  | 800<br>2700   | 114<br>43    |                          |                                                                                              |                                                                                     |
| 4<br>1       | BN 132S                                                                           | 2<br>8            | 2870<br>690 | 13.3<br>13.8 | 73<br>66 | 0.84<br>0.62 | 9.4<br>3.5   | 5.6<br>2.9 | 2.3<br>1.9 | 2.4<br>1.8               | 213<br>44                                                                                  | FD 56                                               | 37   | —<br>—        | 500<br>3500              | 223<br>57                                                                                    | FA 06                                                                               | 37                                                  | 500<br>3500   | 223<br>58                | BA 140                                                                                       | 150                                                                                 | 400<br>3000   | 263<br>76    |                          |                                                                                              |                                                                                     |
| 5.5<br>1.5   | BN 132M                                                                           | 2<br>8            | 2870<br>690 | 18.3<br>21   | 75<br>68 | 0.84<br>0.63 | 12.6<br>5.1  | 6.1<br>2.9 | 2.4<br>1.9 | 2.5<br>1.9               | 270<br>53                                                                                  | FD 06                                               | 50   | —<br>—        | 400<br>2400              | 280<br>66                                                                                    | FA 06                                                                               | 50                                                  | 400<br>2400   | 280<br>67                | BA 140                                                                                       | 150                                                                                 | 350<br>2100   | 320<br>85    |                          |                                                                                              |                                                                                     |

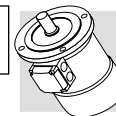
# 2/12 P

## 3000/500 min<sup>-1</sup> - S3 60/40%

## 50 Hz

|              |                                                                                   |  |                   |             |              |          |              |              |            |            |                          | freno c.c. / d.c. brake<br>G.S.-bremse / frein c.c.                               |      |        |                |              |                          | freno c.a. / a.c. brake<br>W.S.-bremse / frein c.a.                                 |      |        |                |                          |                                                                                     |      |           |                |                          |                                                                                     |      |
|--------------|-----------------------------------------------------------------------------------|--|-------------------|-------------|--------------|----------|--------------|--------------|------------|------------|--------------------------|-----------------------------------------------------------------------------------|------|--------|----------------|--------------|--------------------------|-------------------------------------------------------------------------------------|------|--------|----------------|--------------------------|-------------------------------------------------------------------------------------|------|-----------|----------------|--------------------------|-------------------------------------------------------------------------------------|------|
|              |                                                                                   |  |                   |             |              |          |              |              |            |            |                          | FD                                                                                |      |        |                |              |                          | FA                                                                                  |      |        |                |                          | BA                                                                                  |      |           |                |                          |                                                                                     |      |
| Pn           |  |  | n                 | Mn          | η            | cos φ    | In           | Is           | Ms         | Ma         | Jm<br>x 10 <sup>-4</sup> | IM B5                                                                             | Mod. | Mb     | Z <sub>o</sub> |              | Jm<br>x 10 <sup>-4</sup> | IM B5                                                                               | Mod. | Mb     | Z <sub>o</sub> | Jm<br>x 10 <sup>-4</sup> | IM B5                                                                               | Mod. | Mb<br>max | Z <sub>o</sub> | Jm<br>x 10 <sup>-4</sup> | IM B5                                                                               |      |
| kW           |                                                                                   |  | min <sup>-1</sup> | Nm          | %            |          | [400V]<br>A  | In           | Mn         | Mn         | kgm <sup>2</sup>         |  |      | Nm     | NB             | SB           | kgm <sup>2</sup>         |  |      | Nm     | 1/h            | kgm <sup>2</sup>         |  |      | Nm        | 1/h            | kgm <sup>2</sup>         |  |      |
| 0.55<br>0.09 | BN 80B                                                                            |  | 2<br>12           | 2820<br>430 | 1.86<br>2.0  | 64<br>30 | 0.89<br>0.63 | 1.39<br>0.69 | 4.2<br>1.8 | 1.6<br>1.9 | 1.7<br>1.8               | 25                                                                                | 11.3 | FD 04  | 5              | 1000<br>8000 | 1300<br>12000            | 27                                                                                  | 15.2 | FA 04  | 5              | 1300<br>12000            | 27                                                                                  | 15.1 | BA 80     | 18             | 1200<br>11000            | 28                                                                                  | 16.6 |
| 0.75<br>0.12 | BN 90L                                                                            |  | 2<br>12           | 2790<br>430 | 2.6<br>2.7   | 56<br>26 | 0.89<br>0.63 | 2.17<br>1.06 | 4.2<br>1.7 | 1.8<br>1.4 | 1.7<br>1.6               | 26                                                                                | 12.6 | FD 05  | 13             | 1000<br>4600 | 1150<br>6300             | 30                                                                                  | 18.6 | FA 05  | 13             | 1150<br>6300             | 30                                                                                  | 19.3 | BA 90     | 35             | 1050<br>5700             | 33                                                                                  | 19.9 |
| 1.1<br>0.18  | BN 100LA                                                                          |  | 2<br>12           | 2850<br>430 | 3.7<br>4.0   | 65<br>26 | 0.85<br>0.54 | 2.87<br>1.85 | 4.5<br>1.5 | 1.6<br>1.3 | 1.8<br>1.5               | 40                                                                                | 18.3 | FD 15  | 13             | 700<br>4000  | 900<br>6000              | 44                                                                                  | 25   | FA 15  | 13             | 900<br>6000              | 44                                                                                  | 25   | BA 100    | 50             | 750<br>5000              | 52                                                                                  | 29   |
| 1.5<br>0.25  | BN 100LB                                                                          |  | 2<br>12           | 2900<br>440 | 4.9<br>5.4   | 67<br>36 | 0.86<br>0.46 | 3.76<br>2.18 | 5.6<br>1.8 | 1.9<br>1.7 | 1.9<br>1.8               | 54                                                                                | 22   | FD 15  | 13             | 700<br>3800  | 900<br>5000              | 58                                                                                  | 28   | FA 15  | 13             | 900<br>5000              | 58                                                                                  | 29   | BA 100    | 50             | 800<br>4300              | 66                                                                                  | 32   |
| 2<br>0.3     | BN 112M                                                                           |  | 2<br>12           | 2900<br>460 | 6.6<br>6.2   | 74<br>46 | 0.88<br>0.43 | 4.43<br>2.19 | 6.5<br>2   | 2.1<br>2.1 | 2                        | 98                                                                                | 30   | FD 06S | 20             | —<br>—       | 800<br>3400              | 107                                                                                 | 40   | FA 06S | 20             | 800<br>3400              | 107                                                                                 | 42   | BA 110    | 75             | 750<br>3200              | 114                                                                                 | 43   |
| 3<br>0.5     | BN 132S                                                                           |  | 2<br>12           | 2920<br>470 | 9.8<br>10.2  | 74<br>51 | 0.87<br>0.43 | 6.7<br>3.3   | 6.8<br>2   | 2.3<br>1.7 | 1.9<br>1.6               | 213                                                                               | 44   | FD 56  | 37             | —<br>—       | 450<br>3000              | 223                                                                                 | 57   | FA 06  | 37             | 450<br>3000              | 223                                                                                 | 58   | BA 140    | 150            | 380<br>2500              | 263                                                                                 | 76   |
| 4<br>0.7     | BN 132M                                                                           |  | 2<br>12           | 2920<br>460 | 13.1<br>14.5 | 75<br>53 | 0.89<br>0.44 | 8.6<br>4.3   | 5.9<br>1.9 | 2.4<br>1.7 | 2.3<br>1.6               | 270                                                                               | 53   | FD 56  | 37             | —<br>—       | 400<br>2800              | 280                                                                                 | 66   | FA 06  | 37             | 400<br>2800              | 280                                                                                 | 67   | BA 140    | 150            | 350<br>2500              | 320                                                                                 | 85   |



**4/6 P****1500/1000 min<sup>-1</sup> - S1****50 Hz**

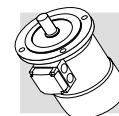
|              |                                                                                   |                            |              |              |          |                   |              |            |            |                                              |                                                                                            |      | freno c.c. / d.c. brake<br>G.S.-bremse / frein c.c. |                    |              |                                              |                                                                                              | freno c.a. / a.c. brake<br>W.S.-bremse / frein c.a. |               |           |                                              |                                                                                              |      |                 |           |                                              |                                                                                              |      |
|--------------|-----------------------------------------------------------------------------------|----------------------------|--------------|--------------|----------|-------------------|--------------|------------|------------|----------------------------------------------|--------------------------------------------------------------------------------------------|------|-----------------------------------------------------|--------------------|--------------|----------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------|-----------|----------------------------------------------|----------------------------------------------------------------------------------------------|------|-----------------|-----------|----------------------------------------------|----------------------------------------------------------------------------------------------|------|
| Pn<br><br>kW |  | n<br><br>min <sup>-1</sup> | Mn<br><br>Nm | η<br><br>%   | cos φ    | In<br>[400V]<br>A | Is<br>In     | Ms<br>Mn   | Ma<br>Mn   | Jm<br>x 10 <sup>-4</sup><br>kgm <sup>2</sup> | IM B5<br> | FD   |                                                     |                    |              |                                              | FA                                                                                           |                                                     |               |           |                                              | BA                                                                                           |      |                 |           |                                              |                                                                                              |      |
|              |                                                                                   |                            |              |              |          |                   |              |            |            |                                              |                                                                                            | Mod. | Mb<br>Nm                                            | Zo<br>1/h<br>NB SB |              | Jm<br>x 10 <sup>-4</sup><br>kgm <sup>2</sup> | IM B5<br> | Mod.                                                | Mb<br>Nm      | Zo<br>1/h | Jm<br>x 10 <sup>-4</sup><br>kgm <sup>2</sup> | IM B5<br> | Mod. | Mb<br>max<br>Nm | Zo<br>1/h | Jm<br>x 10 <sup>-4</sup><br>kgm <sup>2</sup> | IM B5<br> |      |
| 0.22<br>0.13 | <b>BN 71B</b>                                                                     | <b>4</b><br><b>6</b>       | 1410<br>920  | 1.5<br>1.4   | 64<br>43 | 0.74<br>0.67      | 0.67<br>0.65 | 3.9<br>2.3 | 1.8<br>1.6 | 1.9<br>1.7                                   | 9.1                                                                                        | 7.3  | <b>FD 03</b>                                        | 3.5                | 2500<br>5000 | 3500<br>9000                                 | 10.2                                                                                         | 10                                                  | <b>FA 03</b>  | 3.5       | 3500<br>9000                                 | 10.2                                                                                         | 9.7  | <b>BA 70</b>    | 8         | 3200<br>8200                                 | 11.1                                                                                         | 11.2 |
| 0.30<br>0.20 | <b>BN 80A</b>                                                                     | <b>4</b><br><b>6</b>       | 1410<br>930  | 2.0<br>2.1   | 61<br>54 | 0.82<br>0.66      | 0.87<br>0.81 | 3.5<br>3.2 | 1.3<br>1.9 | 1.5<br>2.0                                   | 15                                                                                         | 8.2  | <b>FD 04</b>                                        | 5                  | 2500<br>4000 | 3100<br>6000                                 | 16.6                                                                                         | 12.1                                                | <b>FA 04</b>  | 5         | 3100<br>6000                                 | 16.6                                                                                         | 12.0 | <b>BA 80</b>    | 18        | 2800<br>5500                                 | 18                                                                                           | 13.5 |
| 0.40<br>0.26 | <b>BN 80B</b>                                                                     | <b>4</b><br><b>6</b>       | 1430<br>930  | 2.7<br>2.7   | 63<br>55 | 0.75<br>0.70      | 1.22<br>0.97 | 3.9<br>2.7 | 1.8<br>1.5 | 1.8<br>1.6                                   | 20                                                                                         | 9.9  | <b>FD 04</b>                                        | 10                 | 1800<br>3600 | 2300<br>5500                                 | 22                                                                                           | 13.8                                                | <b>FA 04</b>  | 10        | 2300<br>5500                                 | 22                                                                                           | 13.7 | <b>BA 80</b>    | 18        | 2200<br>5200                                 | 23                                                                                           | 15.2 |
| 0.55<br>0.33 | <b>BN 90S</b>                                                                     | <b>4</b><br><b>6</b>       | 1420<br>930  | 3.7<br>3.4   | 70<br>62 | 0.78<br>0.70      | 1.45<br>1.10 | 4.5<br>3.7 | 2.0<br>2.3 | 1.9<br>2.0                                   | 21                                                                                         | 12.2 | <b>FD 14</b>                                        | 10                 | 1500<br>2500 | 2100<br>4100                                 | 23                                                                                           | 16.1                                                | <b>FA 14</b>  | 10        | 2100<br>4100                                 | 23                                                                                           | 16.3 | <b>BA 90</b>    | 35        | 1700<br>3300                                 | 28                                                                                           | 19.5 |
| 0.75<br>0.45 | <b>BN 90L</b>                                                                     | <b>4</b><br><b>6</b>       | 1420<br>920  | 5.0<br>4.7   | 74<br>66 | 0.78<br>0.71      | 1.88<br>1.39 | 4.3<br>3.3 | 1.9<br>2.0 | 1.8<br>1.9                                   | 28                                                                                         | 14   | <b>FD 05</b>                                        | 13                 | 1400<br>2300 | 2000<br>3600                                 | 32                                                                                           | 20                                                  | <b>FA 05</b>  | 13        | 2000<br>3600                                 | 32                                                                                           | 21   | <b>BA 90</b>    | 35        | 1800<br>3300                                 | 35                                                                                           | 21   |
| 1.1<br>0.8   | <b>BN 100LA</b>                                                                   | <b>4</b><br><b>6</b>       | 1450<br>950  | 7.2<br>8.0   | 74<br>65 | 0.79<br>0.69      | 2.72<br>2.57 | 5.0<br>4.1 | 1.7<br>1.9 | 1.9<br>2.1                                   | 82                                                                                         | 22   | <b>FD 15</b>                                        | 26                 | 1400<br>2100 | 2000<br>3300                                 | 86                                                                                           | 28                                                  | <b>FA 15</b>  | 26        | 2000<br>3300                                 | 86                                                                                           | 29   | <b>BA 100</b>   | 50        | 1800<br>3000                                 | 94                                                                                           | 32   |
| 1.5<br>1.1   | <b>BN 100LB</b>                                                                   | <b>4</b><br><b>6</b>       | 1450<br>950  | 9.9<br>11.1  | 75<br>72 | 0.79<br>0.68      | 3.65<br>3.24 | 5.1<br>4.3 | 1.7<br>2.0 | 1.9<br>2.1                                   | 95                                                                                         | 25   | <b>FD 15</b>                                        | 26                 | 1300<br>2000 | 1800<br>3000                                 | 99                                                                                           | 31                                                  | <b>FA 15</b>  | 26        | 1800<br>3000                                 | 99                                                                                           | 32   | <b>BA 100</b>   | 50        | 1600<br>2800                                 | 107                                                                                          | 34   |
| 2.3<br>1.5   | <b>BN 112M</b>                                                                    | <b>4</b><br><b>6</b>       | 1450<br>960  | 15.2<br>14.9 | 75<br>73 | 0.78<br>0.72      | 5.7<br>4.1   | 5.2<br>4.9 | 1.8<br>2.0 | 1.9<br>2.0                                   | 168                                                                                        | 32   | <b>FD 06S</b>                                       | 40                 | —<br>—       | 1600<br>2400                                 | 177                                                                                          | 42                                                  | <b>FA 06S</b> | 40        | 1600<br>2400                                 | 177                                                                                          | 44   | <b>BA 110</b>   | 75        | 1500<br>2300                                 | 184                                                                                          | 45   |
| 3.1<br>2     | <b>BN 132S</b>                                                                    | <b>4</b><br><b>6</b>       | 1460<br>960  | 20<br>20     | 83<br>77 | 0.83<br>0.75      | 6.5<br>4.9   | 5.9<br>4.5 | 2.1<br>2.1 | 2.0<br>2.1                                   | 213                                                                                        | 44   | <b>FD 56</b>                                        | 37                 | —<br>—       | 1200<br>1900                                 | 223                                                                                          | 57                                                  | <b>FA 06</b>  | 37        | 1200<br>1900                                 | 223                                                                                          | 58   | <b>BA 140</b>   | 150       | 1000<br>1600                                 | 263                                                                                          | 76   |
| 4.2<br>2.6   | <b>BN 132MA</b>                                                                   | <b>4</b><br><b>6</b>       | 1460<br>960  | 27<br>26     | 84<br>79 | 0.82<br>0.72      | 8.8<br>6.6   | 5.9<br>4.3 | 2.1<br>2.0 | 2.2<br>2.0                                   | 270                                                                                        | 53   | <b>FD 06</b>                                        | 50                 | —<br>—       | 900<br>1500                                  | 280                                                                                          | 66                                                  | <b>FA 06</b>  | 50        | 900<br>1500                                  | 280                                                                                          | 67   | <b>BA 140</b>   | 150       | 800<br>1300                                  | 320                                                                                          | 85   |

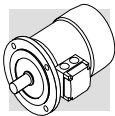
**4/8 P**

**1500/750 min<sup>-1</sup> - S1**

**50 Hz**

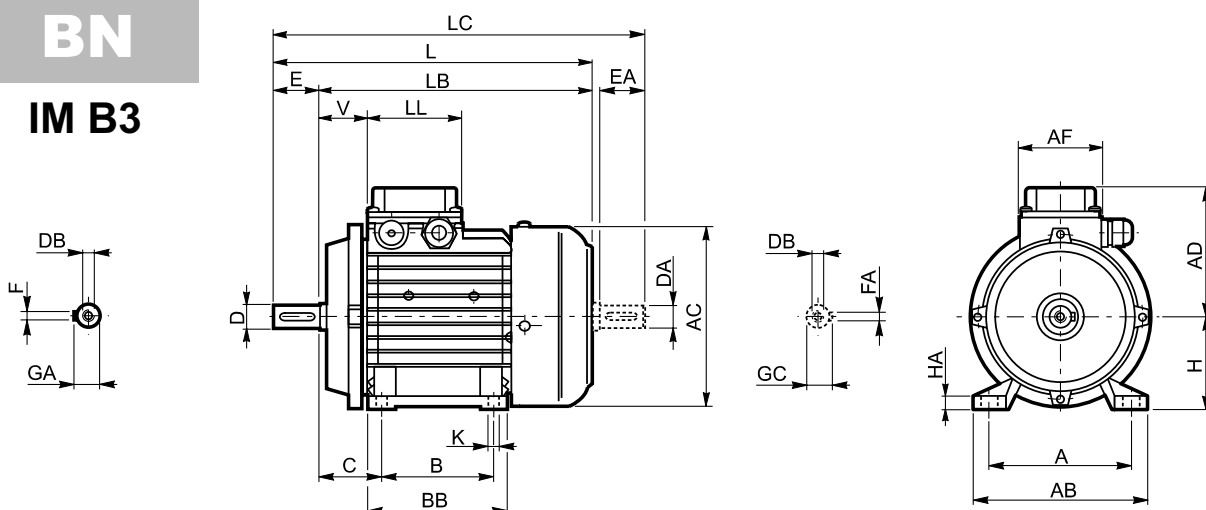
|              |                                                                                   |  |                   |             |              |          |              |              |            |            |                                        | freno c.c. / d.c. brake<br>G.S.-bremse / frein c.c.                               |      |        |     |                                        |                                                                                     | freno c.a. / a.c. brake<br>W.S.-bremse / frein c.a. |      |        |                  |                                                                                     |              |      |        |                  |                                                                                     |       |      |
|--------------|-----------------------------------------------------------------------------------|--|-------------------|-------------|--------------|----------|--------------|--------------|------------|------------|----------------------------------------|-----------------------------------------------------------------------------------|------|--------|-----|----------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------|------|--------|------------------|-------------------------------------------------------------------------------------|--------------|------|--------|------------------|-------------------------------------------------------------------------------------|-------|------|
|              |                                                                                   |  |                   |             |              |          |              |              |            |            |                                        | FD                                                                                |      |        |     |                                        |                                                                                     | FA                                                  |      |        |                  |                                                                                     | BA           |      |        |                  |                                                                                     |       |      |
| Pn           |  |  | n                 | Mn          | η            | cos φ    | In           | Is           | Ms         | Ma         | Jm                                     | IM B5                                                                             | Mod. | Mb     | Zo  |                                        | Jm                                                                                  | IM B5                                               | Mod. | Mb     | Zo               | Jm                                                                                  | IM B5        | Mod. | Mb     | Zo               | Jm                                                                                  | IM B5 |      |
| kW           |                                                                                   |  | min <sup>-1</sup> | Nm          | %            |          | [400V]<br>A  | ln           | Mn         | Mn         | x 10 <sup>-4</sup><br>kgm <sup>2</sup> |  |      | Nm     | 1/h | x 10 <sup>-4</sup><br>kgm <sup>2</sup> |  | Nm                                                  |      | 1/h    | kgm <sup>2</sup> |  | Nm           |      | 1/h    | kgm <sup>2</sup> |  |       |      |
| 0.37<br>0.18 | BN 80A                                                                            |  | 4<br>8            | 1400<br>690 | 2.5<br>2.5   | 63<br>44 | 0.82<br>0.60 | 1.03<br>0.98 | 3.3<br>2.2 | 1.4<br>1.5 | 1.4<br>1.6                             | 15                                                                                | 8.2  | FD 04  | 10  | 2300<br>4500                           | 3500<br>7000                                                                        | 16.6<br>12.1                                        | 12.1 | FA 04  | 10               | 3500<br>7000                                                                        | 16.6<br>12.0 | 12.0 | BA 80  | 18               | 3200<br>6500                                                                        | 18    | 13.5 |
| 0.55<br>0.30 | BN 80B                                                                            |  | 4<br>8            | 1390<br>670 | 3.8<br>4.3   | 65<br>49 | 0.86<br>0.65 | 1.42<br>1.36 | 3.8<br>2.3 | 1.7<br>1.7 | 1.6<br>1.8                             | 20                                                                                | 9.9  | FD 04  | 10  | 2200<br>4200                           | 2900<br>6500                                                                        | 22<br>13.8                                          | 13.8 | FA 04  | 10               | 2900<br>6500                                                                        | 22<br>13.7   | 13.7 | BA 80  | 18               | 2500<br>5600                                                                        | 23    | 15.2 |
| 0.65<br>0.35 | BN 90S                                                                            |  | 4<br>8            | 1390<br>690 | 4.5<br>4.8   | 73<br>49 | 0.85<br>0.57 | 1.51<br>1.81 | 4.0<br>2.5 | 1.9<br>2.1 | 1.9<br>2.2                             | 28                                                                                | 13.6 | FD 14  | 15  | 2300<br>3500                           | 2800<br>6000                                                                        | 30<br>17.8                                          | 17.8 | FA 14  | 15               | 2800<br>6000                                                                        | 30<br>17.7   | 17.7 | BA 90  | 35               | 2400<br>5100                                                                        | 35    | 21   |
| 0.9<br>0.5   | BN 90L                                                                            |  | 4<br>8            | 1370<br>670 | 6.3<br>7.1   | 73<br>57 | 0.87<br>0.62 | 2.05<br>2.04 | 3.8<br>2.4 | 1.8<br>2.1 | 1.8<br>2                               | 30                                                                                | 15.1 | FD 05  | 26  | 1700<br>2500                           | 2100<br>4200                                                                        | 34<br>21                                            | 21   | FA 05  | 26               | 2100<br>4200                                                                        | 34<br>22     | 22   | BA 90  | 35               | 1900<br>3800                                                                        | 37    | 22   |
| 1.3<br>0.7   | BN 100LA                                                                          |  | 4<br>8            | 1420<br>700 | 8.7<br>9.6   | 72<br>58 | 0.83<br>0.64 | 3.14<br>2.72 | 4.3<br>2.8 | 1.7<br>1.8 | 1.8<br>1.8                             | 82                                                                                | 22   | FD 15  | 40  | 1300<br>2000                           | 1700<br>3400                                                                        | 86<br>28                                            | 28   | FA 15  | 40               | 1700<br>3400                                                                        | 86<br>29     | 29   | BA 100 | 50               | 1500<br>3100                                                                        | 94    | 32   |
| 1.8<br>0.9   | BN 100LB                                                                          |  | 4<br>8            | 1420<br>700 | 12.1<br>12.3 | 69<br>62 | 0.87<br>0.63 | 4.3<br>3.3   | 4.2<br>3.2 | 1.6<br>1.7 | 1.7<br>1.8                             | 95                                                                                | 25   | FD 15  | 40  | 1200<br>1600                           | 1700<br>2600                                                                        | 99<br>31                                            | 31   | FA 15  | 40               | 1700<br>2600                                                                        | 99<br>32     | 32   | BA 100 | 50               | 1500<br>2400                                                                        | 107   | 34   |
| 2.2<br>1.2   | BN 112M                                                                           |  | 4<br>8            | 1440<br>710 | 14.6<br>16.1 | 77<br>70 | 0.85<br>0.63 | 4.9<br>3.9   | 5.3<br>3.3 | 1.8<br>1.9 | 1.8<br>1.8                             | 168                                                                               | 32   | FD 06S | 60  | —<br>—                                 | 1200<br>2000                                                                        | 177<br>42                                           | 42   | FA 06S | 60               | 1200<br>2000                                                                        | 177<br>43    | 43   | BA 110 | 75               | 1100<br>1900                                                                        | 184   | 45   |
| 3.6<br>1.8   | BN 132S                                                                           |  | 4<br>8            | 1440<br>720 | 24<br>24     | 80<br>72 | 0.82<br>0.55 | 7.9<br>6.6   | 6.5<br>4.6 | 2.1<br>1.9 | 1.9<br>2                               | 295                                                                               | 45   | FD 56  | 75  | —<br>—                                 | 1000<br>1400                                                                        | 305<br>58                                           | 58   | FA 06  | 75               | 1000<br>1400                                                                        | 305<br>59    | 59   | BA 140 | 150              | 900<br>1200                                                                         | 345   | 77   |
| 4.6<br>2.3   | BN 132M                                                                           |  | 4<br>8            | 1450<br>720 | 30<br>31     | 81<br>73 | 0.83<br>0.54 | 9.9<br>8.4   | 6.5<br>4.4 | 2.2<br>2.3 | 1.9<br>2                               | 383                                                                               | 56   | FD 06  | 100 | —<br>—                                 | 1000<br>1300                                                                        | 393<br>69                                           | 69   | FA 07  | 100              | 1000<br>1300                                                                        | 406<br>74    | 74   | BA 140 | 150              | 900<br>1200                                                                         | 433   | 88   |



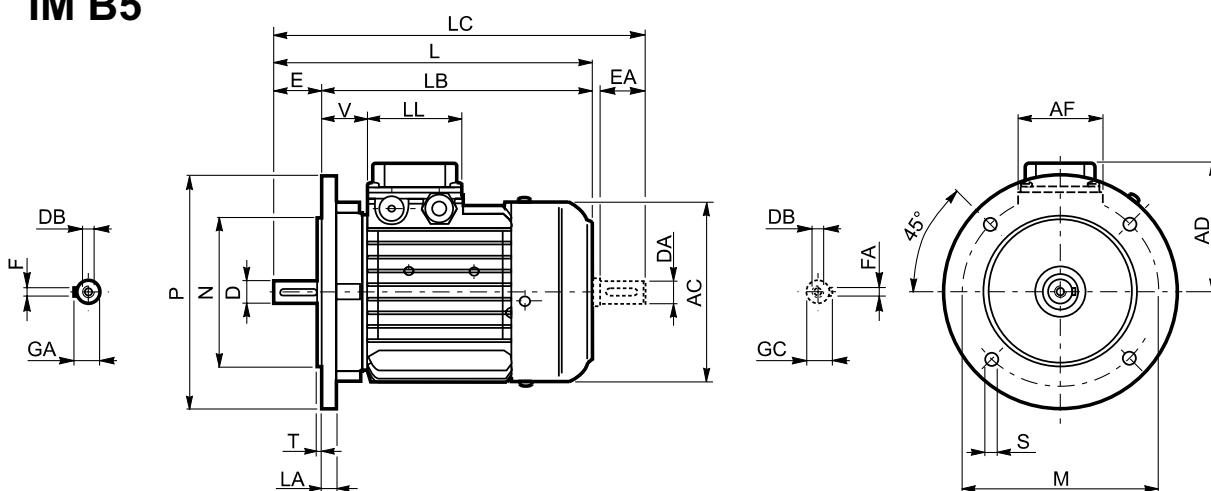


**BN**

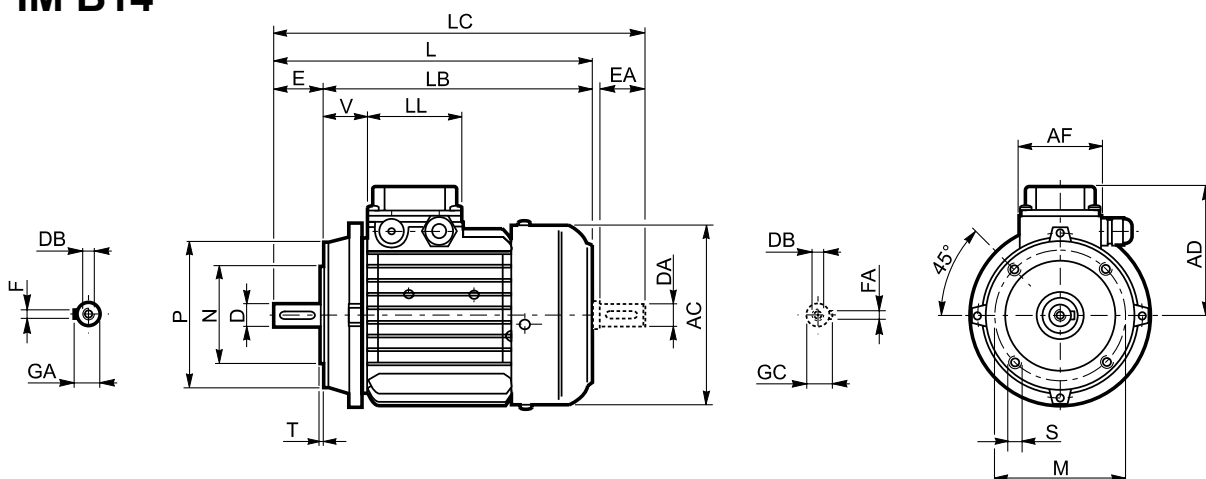
**IM B3**

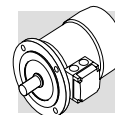


**IM B5**



**IM B14**




**M29 - DIMENSIONI**
**M29 - DIMENSIONS**
**M29 - ABMESSUNGEN**
**M29 - DIMENSIONS**

| <b>BN<br/>(IM B3)</b> | Albero / Shaft / Welle / Arbre |         |     |          |         | Cassa / Frame / Gehäuse / Carcasse |     |     |     |     |    | Motore / Motor / Motor / Moteur |     |     |     |     |     |     |     |     |    |
|-----------------------|--------------------------------|---------|-----|----------|---------|------------------------------------|-----|-----|-----|-----|----|---------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|----|
|                       | D<br>DA                        | E<br>EA | DB  | GA<br>GC | F<br>FA | B                                  | A   | HA  | BB  | AB  | K  | C                               | H   | AC  | L   | LB  | LC  | AD  | AF  | LL  | V  |
| <b>BN 63</b>          | 11                             | 23      | M4  | 12.5     | 4       | 80                                 | 100 | 7   | 96  | 120 | 7  | 40                              | 63  | 121 | 212 | 189 | 237 | 92  | 74  | 80  | 30 |
| <b>BN 71</b>          | 14                             | 30      | M5  | 16       | 5       | 90                                 | 112 | 8   | 112 | 135 | 7  | 45                              | 71  | 138 | 249 | 219 | 281 | 105 | 74  | 80  | 35 |
| <b>BN 80</b>          | 19                             | 40      | M6  | 21.5     | 6       | 100                                | 125 | 9.5 | 124 | 153 | 10 | 50                              | 80  | 156 | 273 | 233 | 315 | 115 | 74  | 80  | 38 |
| <b>BN 90S</b>         | 24                             | 50      | M8  | 27       | 8       | 100                                | 140 | 13  | 130 | 174 | 10 | 56                              | 90  | 176 | 302 | 252 | 354 | 133 | 98  | 98  | 44 |
| <b>BN 90L</b>         | 24                             | 50      | M8  | 27       | 8       | 125                                | 140 | 13  | 155 | 174 | 10 | 56                              | 90  | 176 | 326 | 276 | 379 | 133 | 98  | 98  | 44 |
| <b>BN 100</b>         | 28                             | 60      | M10 | 31       | 8       | 140                                | 160 | 14  | 175 | 192 | 12 | 63                              | 100 | 195 | 366 | 306 | 429 | 142 | 98  | 98  | 50 |
| <b>BN 112</b>         | 28                             | 60      | M10 | 31       | 8       | 140                                | 190 | 14  | 175 | 224 | 12 | 70                              | 112 | 219 | 385 | 325 | 448 | 157 | 98  | 98  | 52 |
| <b>BN 132S</b>        | 38                             | 80      | M12 | 41       | 10      | 140                                | 216 | 16  | 180 | 260 | 12 | 89                              | 132 | 258 | 455 | 375 | 538 | 193 | 118 | 118 | 58 |
| <b>BN 132M</b>        | 38                             | 80      | M12 | 41       | 10      | 178                                | 216 | 16  | 218 | 260 | 12 | 89                              | 132 | 258 | 493 | 413 | 576 | 193 | 118 | 118 | 58 |

| BN<br>(IM B5) | Albero / Shaft / Welle / Arbre |                           |                           |                           |                         | Flangia / Flange / Flansch / Bride |     |     |      |     |      | Motore / Motor / Motor / Moteur |     |     |     |     |     |     |     |  |
|---------------|--------------------------------|---------------------------|---------------------------|---------------------------|-------------------------|------------------------------------|-----|-----|------|-----|------|---------------------------------|-----|-----|-----|-----|-----|-----|-----|--|
|               | D<br>DA                        | E<br>EA                   | DB                        | GA<br>GC                  | F<br>FA                 | M                                  | N   | P   | S    | T   | LA   | AC                              | L   | LB  | LC  | AD  | AF  | LL  | V   |  |
| BN 56         | 9                              | 20                        | M3                        | 10.2                      | 3                       | 100                                | 80  | 120 | 7    | 3   | 8    | 110                             | 185 | 165 | 207 | 91  | 74  | 80  | 34  |  |
| BN 63         | 11                             | 23                        | M4                        | 12.5                      | 4                       | 115                                | 95  | 140 | 9.5  | 3   | 10   | 121                             | 207 | 184 | 232 | 95  | 74  | 80  | 26  |  |
| BN 71         | 14                             | 30                        | M5                        | 16                        | 5                       | 130                                | 110 | 160 | 9.5  | 3.5 | 10   | 138                             | 249 | 219 | 281 | 108 | 74  | 80  | 37  |  |
| BN 80         | 19                             | 40                        | M6                        | 21.5                      | 6                       | 165                                | 130 | 200 | 11.5 | 3.5 | 11.5 | 156                             | 274 | 234 | 315 | 119 | 74  | 80  | 38  |  |
| BN 90         | 24                             | 50                        | M8                        | 27                        | 8                       | 165                                | 130 | 200 | 11.5 | 3.5 | 11.5 | 176                             | 326 | 276 | 378 | 133 | 98  | 98  | 44  |  |
| BN 100        | 28                             | 60                        | M10                       | 31                        | 8                       | 215                                | 180 | 250 | 14   | 4   | 14   | 195                             | 367 | 307 | 429 | 142 | 98  | 98  | 50  |  |
| BN 112        | 28                             | 60                        | M10                       | 31                        | 8                       | 215                                | 180 | 250 | 14   | 4   | 15   | 219                             | 385 | 325 | 448 | 157 | 98  | 98  | 52  |  |
| BN 132        | 38                             | 80                        | M12                       | 41                        | 10                      | 265                                | 230 | 300 | 14   | 4   | 20   | 258                             | 493 | 413 | 576 | 193 | 118 | 118 | 58  |  |
| BN 160 MR     | 42<br>38 <sup>(1)</sup>        | 110<br>80 <sup>(1)</sup>  | M16<br>M12 <sup>(1)</sup> | 45<br>41 <sup>(1)</sup>   | 12<br>10 <sup>(1)</sup> | 300                                | 250 | 350 | 18.5 | 5   | 15   | 258                             | 562 | 452 | 645 | 193 | 118 | 118 | 218 |  |
| BN 160 M      | 42<br>38 <sup>(1)</sup>        | 110<br>80 <sup>(1)</sup>  | M16<br>M12 <sup>(1)</sup> | 45<br>41 <sup>(1)</sup>   | 12<br>10 <sup>(1)</sup> | 300                                | 250 | 350 | 18.5 | 5   | 15   | 310                             | 596 | 486 | 680 | 245 | 187 | 187 | 51  |  |
| BN 160 L      | 42<br>38 <sup>(1)</sup>        | 110<br>80 <sup>(1)</sup>  | M16<br>M12 <sup>(1)</sup> | 45<br>41 <sup>(1)</sup>   | 12<br>10 <sup>(1)</sup> | 300                                | 250 | 350 | 18.5 | 5   | 15   | 310                             | 596 | 486 | 680 | 245 | 187 | 187 | 51  |  |
| BN 180 M      | 48<br>38 <sup>(1)</sup>        | 110<br>80 <sup>(1)</sup>  | M16<br>M12 <sup>(1)</sup> | 51.5<br>41 <sup>(1)</sup> | 14<br>10 <sup>(1)</sup> | 300                                | 250 | 350 | 18.5 | 5   | 15   | 310                             | 640 | 530 | 724 | 245 | 187 | 187 | 51  |  |
| BN 180 L      | 48<br>42 <sup>(1)</sup>        | 110<br>110 <sup>(1)</sup> | M16<br>M16 <sup>(1)</sup> | 51.5<br>45 <sup>(1)</sup> | 14<br>12 <sup>(1)</sup> | 300                                | 250 | 350 | 18.5 | 5   | 18   | 348                             | 708 | 598 | 823 | 261 | 187 | 187 | 52  |  |
| BN 200 L      | 55<br>42 <sup>(1)</sup>        | 110<br>110 <sup>(1)</sup> | M20<br>M16 <sup>(1)</sup> | 59<br>45 <sup>(1)</sup>   | 16<br>12 <sup>(1)</sup> | 350                                | 300 | 400 | 18.5 | 5   | 18   | 348                             | 722 | 612 | 837 | 261 | 187 | 187 | 66  |  |

| BN<br>(IM B14) | Albero / Shaft / Welle / Arbre |         |     |          |         | Flangia / Flange / Flansch / Bride |     |     |     |     | Motore / Motor / Motor / Moteur |     |     |     |     |     |     |    |
|----------------|--------------------------------|---------|-----|----------|---------|------------------------------------|-----|-----|-----|-----|---------------------------------|-----|-----|-----|-----|-----|-----|----|
|                | D<br>DA                        | E<br>EA | DB  | GA<br>GC | F<br>FA | M                                  | N   | P   | S   | T   | AC                              | L   | LB  | LC  | AD  | AF  | LL  | V  |
| BN 56          | 9                              | 20      | M3  | 10.2     | 3       | 65                                 | 50  | 80  | M5  | 2.5 | 110                             | 185 | 165 | 207 | 91  | 74  | 80  | 34 |
| BN 63          | 11                             | 23      | M4  | 12.5     | 4       | 75                                 | 60  | 90  | M5  | 2.5 | 121                             | 207 | 184 | 232 | 95  | 74  | 80  | 26 |
| BN 71          | 14                             | 30      | M5  | 16       | 5       | 85                                 | 70  | 105 | M6  | 2.5 | 138                             | 249 | 219 | 281 | 108 | 74  | 80  | 37 |
| BN 80          | 19                             | 40      | M6  | 21.5     | 6       | 100                                | 80  | 120 | M6  | 3   | 156                             | 274 | 234 | 315 | 119 | 74  | 80  | 38 |
| BN 90          | 24                             | 50      | M8  | 27       | 8       | 115                                | 95  | 140 | M8  | 3   | 176                             | 326 | 276 | 378 | 133 | 98  | 98  | 44 |
| BN 100         | 28                             | 60      | M10 | 31       | 8       | 130                                | 110 | 160 | M8  | 3.5 | 195                             | 366 | 306 | 429 | 142 | 98  | 98  | 50 |
| BN 112         | 28                             | 60      | M10 | 31       | 8       | 130                                | 110 | 160 | M8  | 3.5 | 219                             | 385 | 325 | 448 | 157 | 98  | 98  | 52 |
| BN 132         | 38                             | 80      | M12 | 41       | 10      | 165                                | 130 | 200 | M10 | 4   | 258                             | 493 | 413 | 576 | 193 | 118 | 118 | 58 |

**N.B.:**

1) Queste dimensioni sono riferite alla seconda estremità d'albero

**NOTE:**

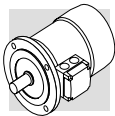
1) These values refer to the rear shaft end.

**HINWEIS:**

1) Diese Maße betreffen das zweite Wellenende.

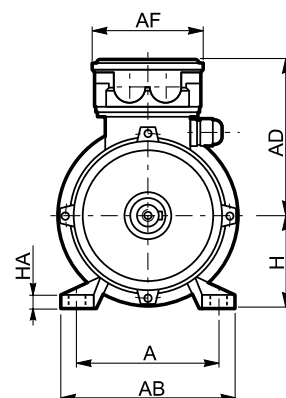
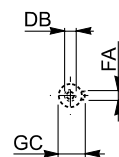
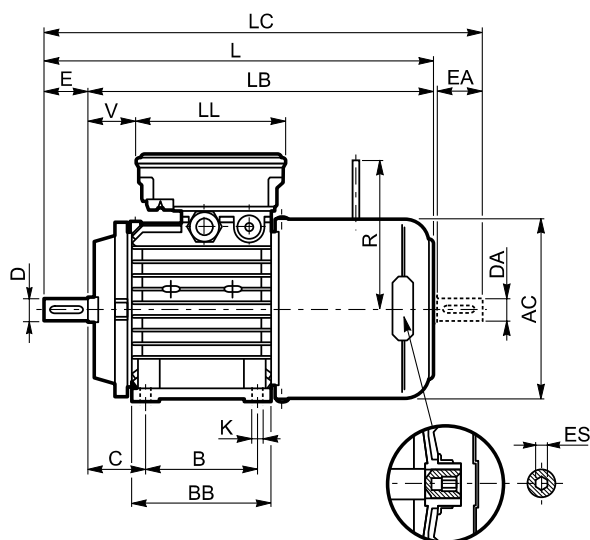
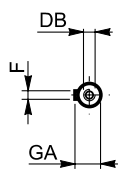
**REMARQUE :**

1) Ces dimensions se réfèrent à la deuxième extrémité de l'arbre.

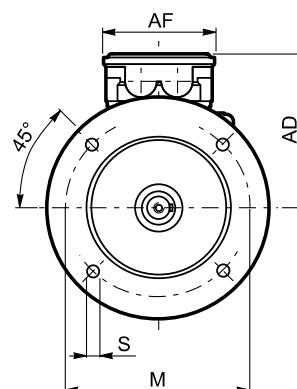
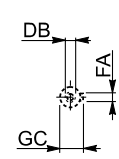
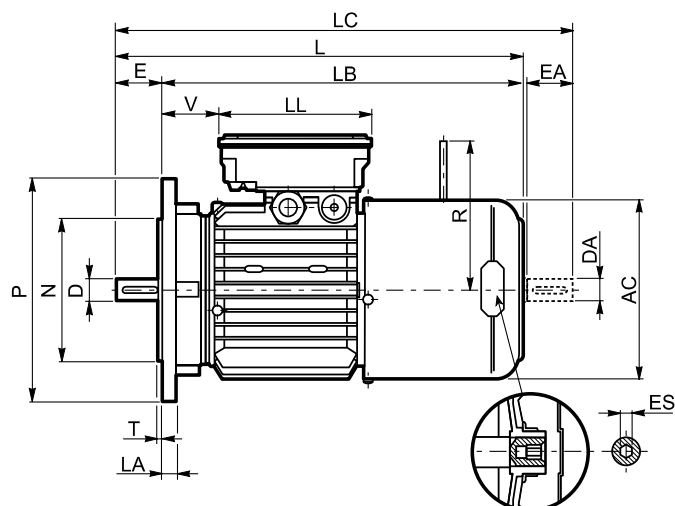
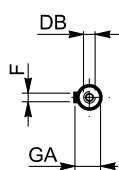


**BN\_FD**

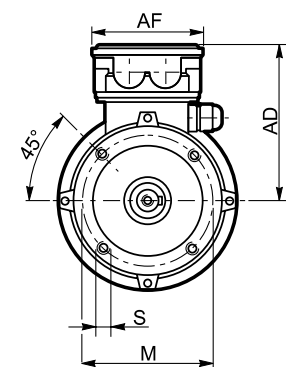
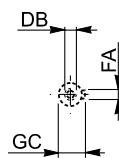
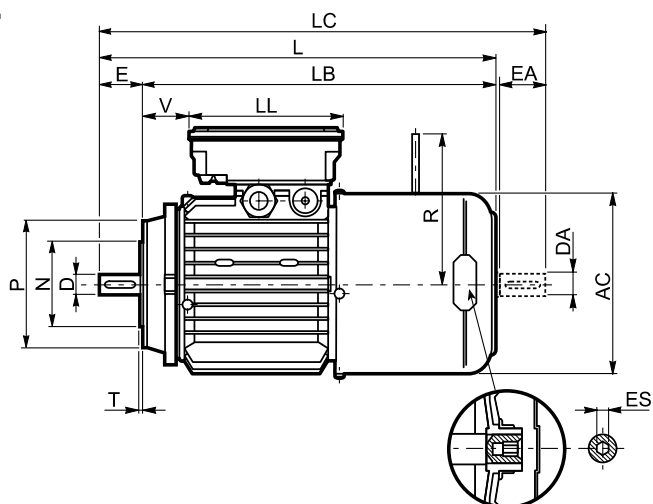
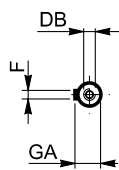
**IM B3**

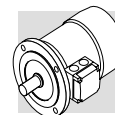


**IM B5**



**IM B14**





| <b>BN_FD<br/>(IM B3)</b> | Albero / Shaft / Welle / Arbre |         |     |          |         | Cassa / Frame / Gehäuse / Carcasse |     |     |     |     |    | Motore / Motor / Motor / Moteur |     |     |     |     |     |     |     |     |     |                    |    |
|--------------------------|--------------------------------|---------|-----|----------|---------|------------------------------------|-----|-----|-----|-----|----|---------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------|----|
|                          | D<br>DA                        | E<br>EA | DB  | GA<br>GC | F<br>FA | B                                  | A   | HA  | BB  | AB  | K  | C                               | H   | AC  | L   | LB  | LC  | AD  | AF  | LL  | V   | R                  | ES |
| BN 63                    | 11                             | 23      | M4  | 12.5     | 4       | 80                                 | 100 | 7   | 96  | 120 | 7  | 40                              | 63  | 121 | 269 | 246 | 294 | 119 | 98  | 133 | 51  | 96                 | 5  |
| BN 71                    | 14                             | 30      | M5  | 16       | 5       | 90                                 | 112 | 8   | 112 | 135 | 7  | 45                              | 71  | 138 | 310 | 280 | 342 | 132 | 98  | 133 | 25  | 103                | 5  |
| BN 80                    | 19                             | 40      | M6  | 21.5     | 6       | 100                                | 125 | 9.5 | 124 | 153 | 10 | 50                              | 80  | 156 | 346 | 306 | 388 | 143 | 98  | 133 | 41  | 129                | 5  |
| BN 90S                   | 24                             | 50      | M8  | 27       | 8       | 100                                | 140 | 13  | 130 | 174 | 10 | 56                              | 90  | 176 | 385 | 335 | 437 | 146 | 110 | 165 | 15  | 129                | 6  |
| BN 90L                   | 24                             | 50      | M8  | 27       | 8       | 125                                | 140 | 13  | 155 | 174 | 10 | 56                              | 90  | 176 | 409 | 359 | 461 | 146 | 110 | 165 | 39  | 160                | 6  |
| BN 100                   | 28                             | 60      | M10 | 31       | 8       | 140                                | 160 | 14  | 175 | 192 | 12 | 63                              | 100 | 195 | 458 | 398 | 521 | 155 | 110 | 165 | 62  | 160                | 6  |
| BN 112                   | 28                             | 60      | M10 | 31       | 8       | 140                                | 190 | 14  | 175 | 224 | 12 | 70                              | 112 | 219 | 484 | 424 | 547 | 170 | 110 | 165 | 73  | 199                | 6  |
| BN 132S                  | 38                             | 80      | M12 | 41       | 10      | 140                                | 216 | 16  | 180 | 260 | 12 | 89                              | 132 | 258 | 565 | 485 | 648 | 193 | 118 | 118 | 142 | 204 <sup>(2)</sup> | 6  |
| BN 132M                  | 38                             | 80      | M12 | 41       | 10      | 178                                | 216 | 16  | 218 | 260 | 12 | 89                              | 132 | 258 | 603 | 523 | 686 | 193 | 118 | 118 | 180 | 204 <sup>(2)</sup> | 6  |

| BN_FD<br>(IM B5) | Albero / Shaft / Welle / Arbre |                           |                           |                           |                         | Flangia / Flange / Flansch / Bride |     |     |      |     |      | Motore / Motor / Motor / Moteur |     |     |     |     |     |     |     |                    |    |  |
|------------------|--------------------------------|---------------------------|---------------------------|---------------------------|-------------------------|------------------------------------|-----|-----|------|-----|------|---------------------------------|-----|-----|-----|-----|-----|-----|-----|--------------------|----|--|
|                  | D<br>DA                        | E<br>EA                   | DB                        | GA<br>GC                  | F<br>FA                 | M                                  | N   | P   | S    | T   | LA   | AC                              | L   | LB  | LC  | AD  | AF  | LL  | V   | R                  | ES |  |
| BN 63            | 11                             | 23                        | M4                        | 12.5                      | 4                       | 115                                | 95  | 140 | 9.5  | 3   | 10   | 121                             | 272 | 249 | 297 | 119 | 98  | 133 | 14  | 96                 | 5  |  |
| BN 71            | 14                             | 30                        | M5                        | 16                        | 5                       | 130                                | 110 | 160 | 9.5  | 3.5 | 10   | 138                             | 310 | 280 | 342 | 132 | 98  | 133 | 25  | 103                | 5  |  |
| BN 80            | 19                             | 40                        | M6                        | 21.5                      | 6                       | 165                                | 130 | 200 | 11.5 | 3.5 | 11.5 | 156                             | 346 | 306 | 388 | 143 | 98  | 133 | 41  | 129                | 5  |  |
| BN 90            | 24                             | 50                        | M8                        | 27                        | 8                       | 165                                | 130 | 200 | 11.5 | 3.5 | 11.5 | 176                             | 409 | 359 | 461 | 146 | 110 | 165 | 39  | 160                | 6  |  |
| BN 100           | 28                             | 60                        | M10                       | 31                        | 8                       | 215                                | 180 | 250 | 14   | 4   | 14   | 195                             | 458 | 398 | 521 | 155 | 110 | 165 | 62  | 160                | 6  |  |
| BN 112           | 28                             | 60                        | M10                       | 31                        | 8                       | 215                                | 180 | 250 | 14   | 4   | 15   | 219                             | 484 | 424 | 547 | 170 | 110 | 165 | 73  | 199                | 6  |  |
| BN 132           | 38                             | 80                        | M12                       | 41                        | 10                      | 265                                | 230 | 300 | 14   | 4   | 16   | 258                             | 603 | 523 | 686 | 193 | 118 | 118 | 180 | 204 <sup>(2)</sup> | 6  |  |
| BN 160 MR        | 42<br>38 <sup>(1)</sup>        | 110<br>80 <sup>(1)</sup>  | M16<br>M12 <sup>(1)</sup> | 45<br>41 <sup>(1)</sup>   | 12<br>10 <sup>(1)</sup> | 300                                | 250 | 350 | 18.5 | 5   | 15   | 258                             | 672 | 562 | 755 | 193 | 118 | 118 | 218 | 226                | 6  |  |
| BN 160 M         | 42<br>38 <sup>(1)</sup>        | 110<br>80 <sup>(1)</sup>  | M16<br>M12 <sup>(1)</sup> | 45<br>41 <sup>(1)</sup>   | 12<br>10 <sup>(1)</sup> | 300                                | 250 | 350 | 18.5 | 5   | 15   | 310                             | 736 | 626 | 820 | 245 | 187 | 187 | 51  | 266                | —  |  |
| BN 160 L         | 42<br>38 <sup>(1)</sup>        | 110<br>80 <sup>(1)</sup>  | M16<br>M12 <sup>(1)</sup> | 45<br>41 <sup>(1)</sup>   | 12<br>10 <sup>(1)</sup> | 300                                | 250 | 350 | 18.5 | 5   | 15   | 310                             | 736 | 626 | 820 | 245 | 187 | 187 | 51  | 266                | —  |  |
| BN 180 M         | 48<br>38 <sup>(1)</sup>        | 110<br>80 <sup>(1)</sup>  | M16<br>M12 <sup>(1)</sup> | 51.5<br>41 <sup>(1)</sup> | 14<br>10 <sup>(1)</sup> | 300                                | 250 | 350 | 18.5 | 5   | 15   | 310                             | 780 | 670 | 864 | 245 | 187 | 187 | 51  | 266                | —  |  |
| BN 180 L         | 48<br>42 <sup>(1)</sup>        | 110<br>110 <sup>(1)</sup> | M16<br>M16 <sup>(1)</sup> | 51.5<br>45 <sup>(1)</sup> | 14<br>12 <sup>(1)</sup> | 300                                | 250 | 350 | 18.5 | 5   | 18   | 348                             | 866 | 756 | 981 | 261 | 187 | 187 | 52  | 305                | —  |  |
| BN 200 L         | 55<br>42 <sup>(1)</sup>        | 110<br>110 <sup>(1)</sup> | M20<br>M16 <sup>(1)</sup> | 59<br>45 <sup>(1)</sup>   | 16<br>12 <sup>(1)</sup> | 350                                | 300 | 400 | 18.5 | 5   | 18   | 348                             | 878 | 768 | 993 | 261 | 187 | 187 | 64  | 305                | —  |  |

| BN_FD<br>(IM B14) | Albero / Shaft / Welle / Arbre |         |     |          |         | Flangia / Flange / Flansch / Bride |     |     |     |     | Motore / Motor / Motor / Moteur |     |     |     |     |     |     |     |                    |    |  |
|-------------------|--------------------------------|---------|-----|----------|---------|------------------------------------|-----|-----|-----|-----|---------------------------------|-----|-----|-----|-----|-----|-----|-----|--------------------|----|--|
|                   | D<br>DA                        | E<br>EA | DB  | GA<br>GC | F<br>FA | M                                  | N   | P   | S   | T   | AC                              | L   | LB  | LC  | AD  | AF  | LL  | V   | R                  | ES |  |
| BN 63             | 11                             | 23      | M4  | 12.5     | 4       | 75                                 | 60  | 90  | M5  | 2.5 | 121                             | 272 | 249 | 297 | 119 | 98  | 133 | 14  | 96                 | 5  |  |
| BN 71             | 14                             | 30      | M5  | 16       | 5       | 85                                 | 70  | 105 | M6  | 2.5 | 138                             | 310 | 280 | 342 | 132 | 98  | 133 | 25  | 103                | 5  |  |
| BN 80             | 19                             | 40      | M6  | 21.5     | 6       | 100                                | 80  | 120 | M6  | 3   | 156                             | 346 | 306 | 388 | 143 | 98  | 133 | 41  | 129                | 5  |  |
| BN 90             | 24                             | 50      | M8  | 27       | 8       | 115                                | 95  | 140 | M8  | 3   | 176                             | 409 | 359 | 461 | 146 | 110 | 165 | 39  | 160                | 6  |  |
| BN 100            | 28                             | 60      | M10 | 31       | 8       | 130                                | 110 | 160 | M8  | 3.5 | 195                             | 458 | 398 | 521 | 155 | 110 | 165 | 62  | 160                | 6  |  |
| BN 112            | 28                             | 60      | M10 | 31       | 8       | 130                                | 110 | 160 | M8  | 3.5 | 219                             | 484 | 424 | 547 | 170 | 110 | 165 | 73  | 199                | 6  |  |
| BN 132            | 38                             | 80      | M12 | 41       | 10      | 165                                | 130 | 200 | M10 | 4   | 258                             | 603 | 523 | 686 | 193 | 118 | 118 | 180 | 204 <sup>(2)</sup> | 6  |  |

N.B.:

1) Queste dimensioni sono riferite alla seconda estremità d'albero.

2) Per freno FD07 quota R=226

L'esagono ES non è presente con l'opzione PS

NOTE:

1) These values refer to the rear shaft end.

2) For FD07 brake value R=226

ES hexagon is not supplied with PS option

HINWEIS:

1) Diese Maße betreffen das zweite Wellenende

2) Für Bremse FD07, Maß R=226

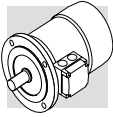
Der Sechskant ES ist bei der Option PS nicht vorhanden.

REMARQUE :

1) Ces dimensions se réfèrent à la deuxième extrémité de l'arbre

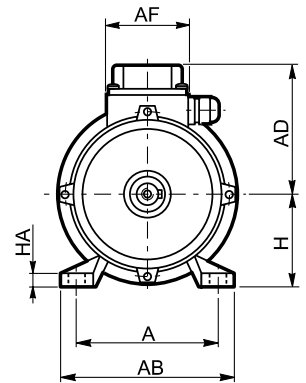
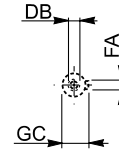
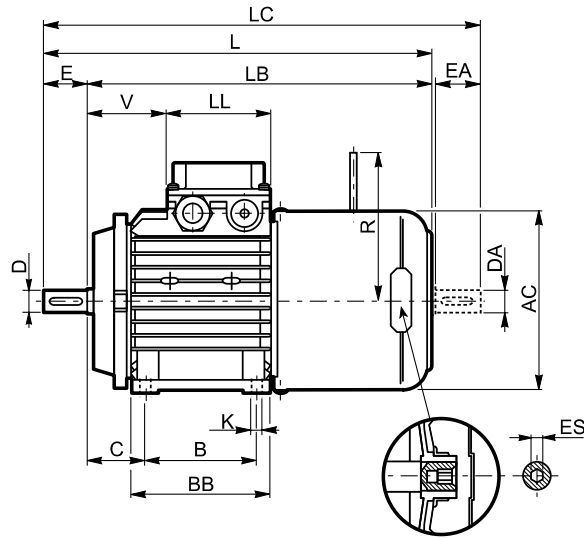
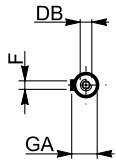
2) Pour frein FD07 valeur R=226

L'hexagone ES n'est pas disponible avec l'option PS

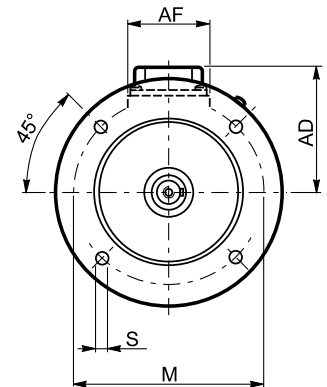
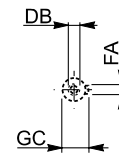
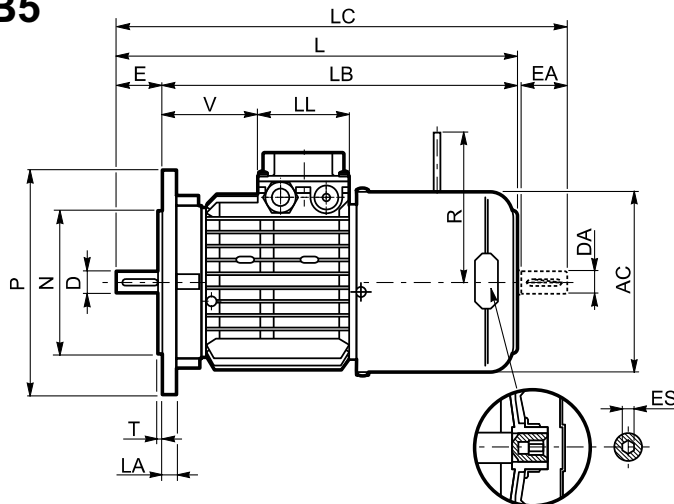
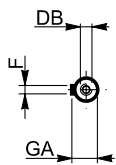


**BN\_FA**

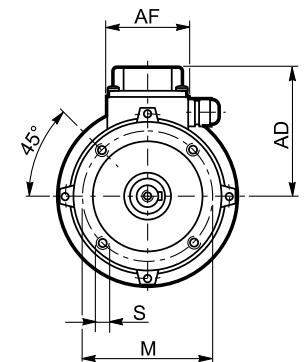
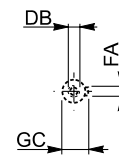
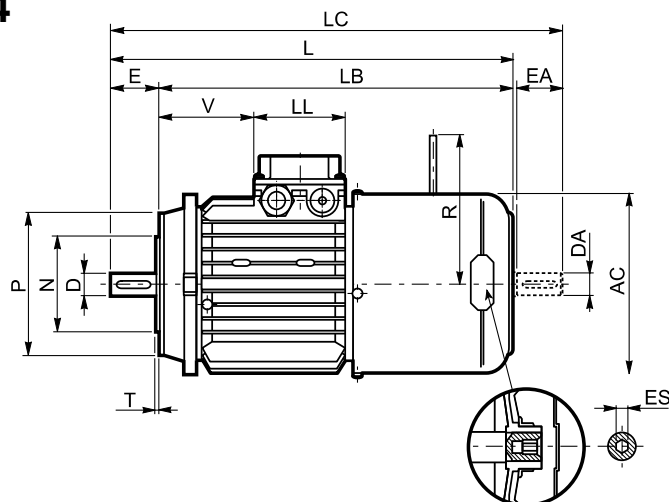
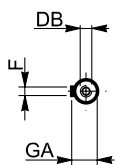
**IM B3**

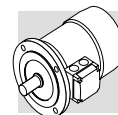


**IM B5**



**IM B14**





| BN_FA<br>(IM B3) | Albero / Shaft / Welle / Arbre |         |     |          |         | Cassa / Frame / Gehäuse / Carcasse |     |     |     |     |    | Motore / Motor / Motor / Moteur |     |     |     |     |     |     |     |     |     |                    |    |
|------------------|--------------------------------|---------|-----|----------|---------|------------------------------------|-----|-----|-----|-----|----|---------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------|----|
|                  | D<br>DA                        | E<br>EA | DB  | GA<br>GC | F<br>FA | B                                  | A   | HA  | BB  | AB  | K  | C                               | H   | AC  | L   | LB  | LC  | AD  | AF  | LL  | V   | R                  | ES |
| BN 63            | 11                             | 23      | M4  | 12.5     | 4       | 80                                 | 100 | 7   | 96  | 120 | 7  | 40                              | 63  | 121 | 269 | 246 | 294 | 92  | 74  | 80  | 51  | 116                | 5  |
| BN 71            | 14                             | 30      | M5  | 16       | 5       | 90                                 | 112 | 8   | 112 | 135 | 7  | 45                              | 71  | 138 | 310 | 280 | 342 | 105 | 74  | 80  | 68  | 124                | 5  |
| BN 80            | 19                             | 40      | M6  | 21.5     | 6       | 100                                | 125 | 9.5 | 124 | 153 | 10 | 50                              | 80  | 156 | 346 | 306 | 388 | 115 | 74  | 80  | 83  | 134                | 5  |
| BN 90S           | 24                             | 50      | M8  | 27       | 8       | 100                                | 140 | 13  | 130 | 174 | 10 | 56                              | 90  | 176 | 385 | 335 | 437 | 133 | 98  | 98  | 71  | 134                | 6  |
| BN 90L           | 24                             | 50      | M8  | 27       | 8       | 125                                | 140 | 13  | 155 | 174 | 10 | 56                              | 90  | 176 | 409 | 359 | 461 | 133 | 98  | 98  | 95  | 160                | 6  |
| BN 100           | 28                             | 60      | M10 | 31       | 8       | 140                                | 160 | 14  | 175 | 192 | 12 | 63                              | 100 | 195 | 458 | 398 | 521 | 142 | 98  | 98  | 119 | 160                | 6  |
| BN 112           | 28                             | 60      | M10 | 31       | 8       | 140                                | 190 | 14  | 175 | 224 | 12 | 70                              | 112 | 219 | 484 | 424 | 547 | 157 | 98  | 98  | 142 | 198                | 6  |
| BN 132S          | 38                             | 80      | M12 | 41       | 10      | 140                                | 216 | 16  | 180 | 260 | 12 | 89                              | 132 | 258 | 565 | 485 | 648 | 193 | 118 | 118 | 180 | 200 <sup>(2)</sup> | 6  |
| BN 132M          | 38                             | 80      | M12 | 41       | 10      | 178                                | 216 | 16  | 218 | 260 | 12 | 89                              | 132 | 258 | 603 | 523 | 686 | 193 | 118 | 118 | 180 | 200 <sup>(2)</sup> | 6  |

| BN_FA<br>(IM B5) | Albero / Shaft / Welle / Arbre |                          |                           |                           |                         | Flangia / Flange / Flansch / Bride |     |     |      |     |      | Motore / Motor / Motor / Moteur |     |     |     |     |     |     |     |                    |    |  |
|------------------|--------------------------------|--------------------------|---------------------------|---------------------------|-------------------------|------------------------------------|-----|-----|------|-----|------|---------------------------------|-----|-----|-----|-----|-----|-----|-----|--------------------|----|--|
|                  | D<br>DA                        | E<br>EA                  | DB                        | GA<br>GC                  | F<br>FA                 | M                                  | N   | P   | S    | T   | LA   | AC                              | L   | LB  | LC  | AD  | AF  | LL  | V   | R                  | ES |  |
| BN 63            | 11                             | 23                       | M4                        | 12.5                      | 4                       | 115                                | 95  | 140 | 9.5  | 3   | 10   | 121                             | 272 | 249 | 297 | 95  | 74  | 80  | 26  | 116                | 5  |  |
| BN 71            | 14                             | 30                       | M5                        | 16                        | 5                       | 130                                | 110 | 160 | 9.5  | 3.5 | 10   | 138                             | 310 | 280 | 342 | 108 | 74  | 80  | 68  | 124                | 5  |  |
| BN 80            | 19                             | 40                       | M6                        | 21.5                      | 6                       | 165                                | 130 | 200 | 11.5 | 3.5 | 11.5 | 156                             | 346 | 306 | 388 | 119 | 74  | 80  | 83  | 134                | 5  |  |
| BN 90            | 24                             | 50                       | M8                        | 27                        | 8                       | 165                                | 130 | 200 | 11.5 | 3.5 | 11.5 | 176                             | 409 | 359 | 461 | 133 | 98  | 98  | 95  | 160                | 6  |  |
| BN 100           | 28                             | 60                       | M10                       | 31                        | 8                       | 215                                | 180 | 250 | 14   | 4   | 14   | 195                             | 458 | 398 | 521 | 142 | 98  | 98  | 119 | 160                | 6  |  |
| BN 112           | 28                             | 60                       | M10                       | 31                        | 8                       | 215                                | 180 | 250 | 14   | 4   | 15   | 219                             | 484 | 424 | 547 | 157 | 98  | 98  | 128 | 198                | 6  |  |
| BN 132           | 38                             | 80                       | M12                       | 41                        | 10                      | 265                                | 230 | 300 | 14   | 4   | 16   | 258                             | 603 | 523 | 686 | 193 | 118 | 118 | 180 | 200 <sup>(2)</sup> | 6  |  |
| BN 160 MR        | 42<br>38 <sup>(1)</sup>        | 110<br>80 <sup>(1)</sup> | M16<br>M12 <sup>(1)</sup> | 45<br>41 <sup>(1)</sup>   | 12<br>10 <sup>(1)</sup> | 300                                | 250 | 350 | 18.5 | 5   | 15   | 258                             | 672 | 562 | 755 | 193 | 118 | 118 | 218 | 217                | 6  |  |
| BN 160 M         | 42<br>38 <sup>(1)</sup>        | 110<br>80 <sup>(1)</sup> | M16<br>M12 <sup>(1)</sup> | 45<br>41 <sup>(1)</sup>   | 12<br>10 <sup>(1)</sup> | 300                                | 250 | 350 | 18.5 | 5   | 15   | 310                             | 736 | 626 | 820 | 245 | 187 | 187 | 51  | 247                | —  |  |
| BN 160 L         | 42<br>38 <sup>(1)</sup>        | 110<br>80 <sup>(1)</sup> | M16<br>M12 <sup>(1)</sup> | 45<br>41 <sup>(1)</sup>   | 12<br>10 <sup>(1)</sup> | 300                                | 250 | 350 | 18.5 | 5   | 15   | 310                             | 736 | 626 | 820 | 245 | 187 | 187 | 51  | 247                | —  |  |
| BN 180 M         | 48<br>38 <sup>(1)</sup>        | 110<br>80 <sup>(1)</sup> | M16<br>M12 <sup>(1)</sup> | 51.5<br>41 <sup>(1)</sup> | 14<br>10 <sup>(1)</sup> | 300                                | 250 | 350 | 18.5 | 5   | 15   | 310                             | 780 | 670 | 864 | 245 | 187 | 187 | 51  | 247                | —  |  |

| BN_FA<br>(IM B14) | Albero / Shaft / Welle / Arbre |         |     |          |         | Flangia / Flange / Flansch / Bride |     |     |     |     | Motore / Motor / Motor / Moteur |     |     |     |     |     |     |     |                    |    |
|-------------------|--------------------------------|---------|-----|----------|---------|------------------------------------|-----|-----|-----|-----|---------------------------------|-----|-----|-----|-----|-----|-----|-----|--------------------|----|
|                   | D<br>DA                        | E<br>EA | DB  | GA<br>GC | F<br>FA | M                                  | N   | P   | S   | T   | AC                              | L   | LB  | LC  | AD  | AF  | LL  | V   | R                  | ES |
| BN 63             | 11                             | 23      | M4  | 12.5     | 4       | 75                                 | 60  | 90  | M5  | 2.5 | 121                             | 272 | 249 | 119 | 95  | 74  | 80  | 26  | 116                | 5  |
| BN 71             | 14                             | 30      | M5  | 16       | 5       | 85                                 | 70  | 105 | M6  | 2.5 | 138                             | 310 | 280 | 342 | 108 | 74  | 80  | 68  | 124                | 5  |
| BN 80             | 19                             | 40      | M6  | 21.5     | 6       | 100                                | 80  | 120 | M6  | 3   | 156                             | 346 | 306 | 388 | 119 | 74  | 80  | 83  | 134                | 5  |
| BN 90             | 24                             | 50      | M8  | 27       | 8       | 115                                | 95  | 140 | M8  | 3   | 176                             | 409 | 359 | 461 | 133 | 98  | 98  | 95  | 160                | 6  |
| BN 100            | 28                             | 60      | M10 | 31       | 8       | 130                                | 110 | 160 | M8  | 3.5 | 195                             | 458 | 398 | 521 | 142 | 98  | 98  | 119 | 160                | 6  |
| BN 112            | 28                             | 60      | M10 | 31       | 8       | 130                                | 110 | 160 | M8  | 3.5 | 219                             | 484 | 424 | 547 | 157 | 98  | 98  | 128 | 198                | 6  |
| BN 132            | 38                             | 80      | M12 | 41       | 10      | 165                                | 130 | 200 | M10 | 4   | 258                             | 603 | 523 | 686 | 193 | 118 | 118 | 180 | 200 <sup>(2)</sup> | 6  |

N.B.:

1) Queste dimensioni sono riferite alla seconda estremità d'albero.

2) Per freno FD07 quota R=226  
Le dimensioni AD, AF, LL e V relative alla scatola morsetti dei motori BN...FA dotati di alimentazione separata del freno (opzione SA) coincidono con quelle dei motori BN...FD di pari taglia.

L'esagono ES non è presente con l'opzione PS.

NOTE:

1) These values refer to the rear shaft end.

2) For FD07 brake value R=226  
Dimensions AD, AF, LL and V, relevant to terminal box of motors BN...FA featuring the separate brake supply (option SA), are coincident with corresponding dimensions of same-size BN...FD motors.

ES hexagon is not supplied with PS option.

HINWEIS:

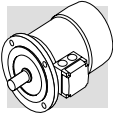
1) Diese Maße betreffen das zweite Wellenende

2) Für Bremse FD07, Maß R=226  
Die Abmessungen des Klemmenkastens der Motoren BN ... FA AD, AF, LL und V in Bezug auf die separate Spannungsversorgung (Option SA) stimmen mit den Abmessungen der entsprechenden Motoren BN...FD überein.  
Der Sechskant ES ist bei der Option PS nicht vorhanden.

REMARQUE :

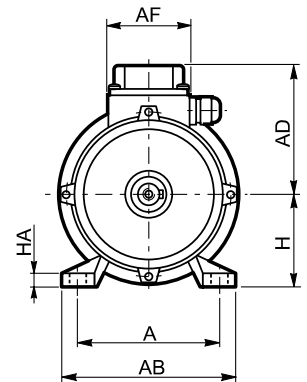
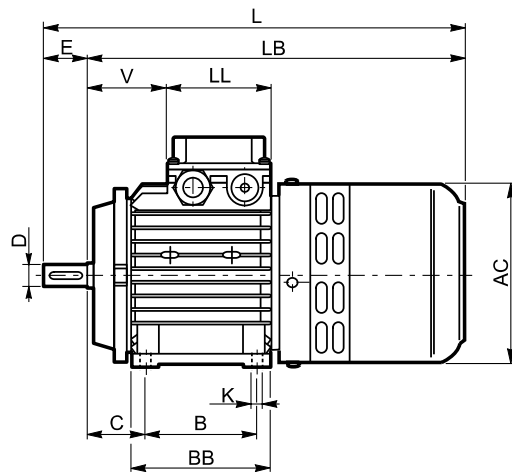
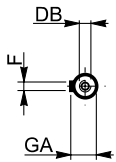
1) Ces dimensions se réfèrent à la deuxième extrémité de l'arbre

2) Pour frein FD07 valeur R=226  
Les dimensions AD, AF, LL et V relatives à la boîte à borne des moteurs BN...FA équipés d'alimentation séparée du frein (option SA) sont identiques à celles des moteurs BN...FD de la même taille.  
L'hexagone ES n'est pas disponible avec l'option PS.

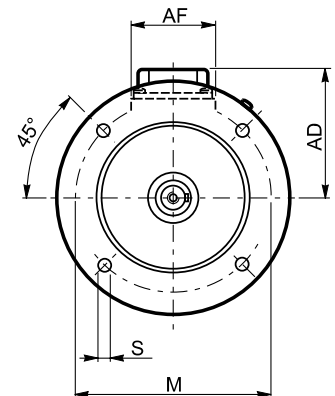
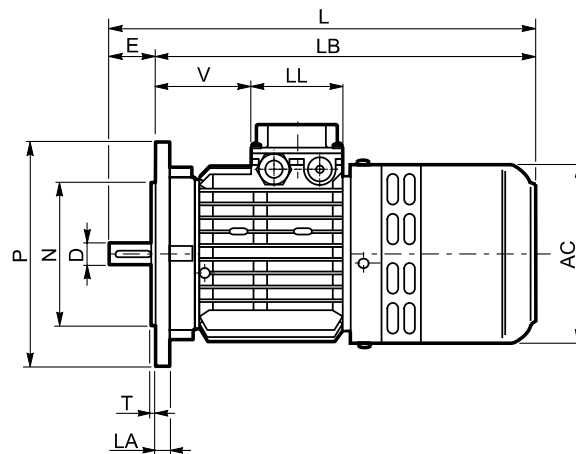
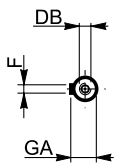


**BN\_BA**

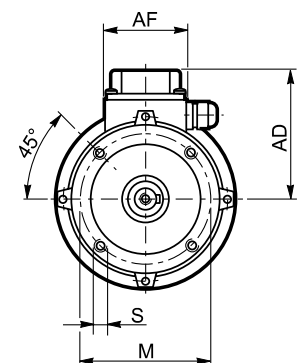
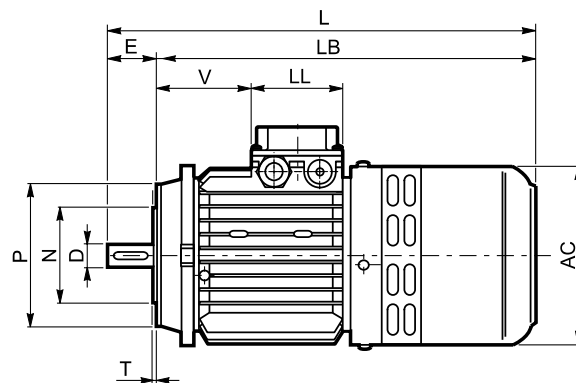
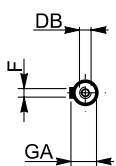
**IM B3**

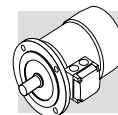


**IM B5**



**IM B14**





| <b>BN_BA<br/>(IM B3)</b> | Albero / Shaft / Welle / Arbre |         |     |          |         | Cassa / Frame / Gehäuse / Carcasse |     |     |     |     |    | Motore / Motor / Motor / Moteur |     |     |     |     |     |     |     |     |     |
|--------------------------|--------------------------------|---------|-----|----------|---------|------------------------------------|-----|-----|-----|-----|----|---------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                          | D<br>DA                        | E<br>EA | DB  | GA<br>GC | F<br>FA | B                                  | A   | HA  | BB  | AB  | K  | C                               | H   | AC  | L   | LB  | LC  | AD  | AF  | LL  | V   |
| <b>BN 71</b>             | 14                             | 30      | M5  | 16       | 5       | 90                                 | 112 | 8   | 112 | 135 | 7  | 45                              | 71  | 138 | 327 | 298 | 342 | 108 | 74  | 80  | 68  |
| <b>BN 80</b>             | 19                             | 40      | M6  | 21.5     | 6       | 100                                | 125 | 9.5 | 124 | 153 | 10 | 50                              | 80  | 156 | 372 | 332 | 388 | 119 | 74  | 80  | 83  |
| <b>BN 90S</b>            | 24                             | 50      | M8  | 27       | 8       | 100                                | 140 | 13  | 130 | 174 | 10 | 56                              | 90  | 176 | 400 | 350 | 437 | 133 | 98  | 98  | 71  |
| <b>BN 90L</b>            | 24                             | 50      | M8  | 27       | 8       | 125                                | 140 | 13  | 155 | 174 | 10 | 56                              | 90  | 176 | 425 | 375 | 461 | 133 | 98  | 98  | 95  |
| <b>BN 100</b>            | 28                             | 60      | M10 | 31       | 8       | 140                                | 160 | 14  | 175 | 192 | 12 | 63                              | 100 | 195 | 477 | 417 | 521 | 142 | 98  | 98  | 119 |
| <b>BN 112</b>            | 28                             | 60      | M10 | 31       | 8       | 140                                | 190 | 14  | 175 | 224 | 12 | 70                              | 112 | 219 | 500 | 440 | 547 | 157 | 98  | 98  | 128 |
| <b>BN 132S</b>           | 38                             | 80      | M12 | 41       | 10      | 140                                | 216 | 16  | 180 | 260 | 12 | 89                              | 132 | 258 | 600 | 520 | 648 | 193 | 118 | 118 | 142 |
| <b>BN 132M</b>           | 38                             | 80      | M12 | 41       | 10      | 178                                | 216 | 16  | 218 | 260 | 12 | 89                              | 132 | 258 | 638 | 558 | 686 | 193 | 118 | 118 | 180 |

| <b>BN_BA<br/>(IM B5)</b> | Albero / Shaft / Welle / Arbre |         |     |          |         | Flangia / Flange / Flansch / Bride |     |     |      |     |      | Motore / Motor / Motor / Moteur |     |     |     |     |     |     |
|--------------------------|--------------------------------|---------|-----|----------|---------|------------------------------------|-----|-----|------|-----|------|---------------------------------|-----|-----|-----|-----|-----|-----|
|                          | D<br>DA                        | E<br>EA | DB  | GA<br>GC | F<br>FA | M                                  | N   | P   | S    | T   | LA   | AC                              | L   | LB  | AD  | AF  | LL  | V   |
| <b>BN63</b>              | 11                             | 23      | M4  | 12.5     | 4       | 115                                | 95  | 140 | 9.5  | 3   | 10   | 124                             | 298 | 275 | 95  | 74  | 80  | 28  |
| <b>BN 71</b>             | 14                             | 30      | M5  | 16       | 5       | 130                                | 110 | 160 | 9.5  | 3.5 | 10   | 138                             | 327 | 297 | 108 | 74  | 80  | 68  |
| <b>BN 80</b>             | 19                             | 40      | M6  | 21.5     | 6       | 165                                | 130 | 200 | 11.5 | 3.5 | 11.5 | 156                             | 372 | 332 | 119 | 74  | 80  | 83  |
| <b>BN 90</b>             | 24                             | 50      | M8  | 27       | 8       | 165                                | 130 | 200 | 11.5 | 3.5 | 11.5 | 176                             | 425 | 375 | 133 | 98  | 98  | 95  |
| <b>BN 100</b>            | 28                             | 60      | M10 | 31       | 8       | 215                                | 180 | 250 | 14   | 4   | 14   | 195                             | 477 | 417 | 142 | 98  | 98  | 119 |
| <b>BN 112</b>            | 28                             | 60      | M10 | 31       | 8       | 215                                | 180 | 250 | 14   | 4   | 15   | 219                             | 500 | 440 | 157 | 98  | 98  | 128 |
| <b>BN 132</b>            | 38                             | 80      | M12 | 41       | 10      | 265                                | 230 | 300 | 14   | 4   | 16   | 258                             | 638 | 558 | 193 | 118 | 118 | 180 |

| <b>BN_BA<br/>(IM B14)</b> | Albero / Shaft / Welle / Arbre |         |     |          |         | Flangia / Flange / Flansch / Bride |     |     |     |     | Motore / Motor / Motor / Moteur |     |     |     |     |     |     |
|---------------------------|--------------------------------|---------|-----|----------|---------|------------------------------------|-----|-----|-----|-----|---------------------------------|-----|-----|-----|-----|-----|-----|
|                           | D<br>DA                        | E<br>EA | DB  | GA<br>GC | F<br>FA | M                                  | N   | P   | S   | T   | AC                              | L   | LB  | AD  | AF  | LL  | V   |
| <b>BN 63</b>              | 11                             | 23      | M4  | 12.5     | 4       | 75                                 | 60  | 90  | M5  | 2.5 | 124                             | 298 | 275 | 95  | 74  | 80  | 28  |
| <b>BN 71</b>              | 14                             | 30      | M5  | 16       | 5       | 85                                 | 70  | 105 | M6  | 2.5 | 138                             | 327 | 297 | 108 | 74  | 80  | 68  |
| <b>BN 80</b>              | 19                             | 40      | M6  | 21.5     | 6       | 100                                | 80  | 120 | M6  | 3   | 156                             | 372 | 332 | 119 | 74  | 80  | 83  |
| <b>BN 90</b>              | 24                             | 50      | M8  | 27       | 8       | 115                                | 95  | 140 | M8  | 3   | 176                             | 425 | 375 | 133 | 98  | 98  | 95  |
| <b>BN 100</b>             | 28                             | 60      | M10 | 31       | 8       | 130                                | 110 | 160 | M8  | 3.5 | 195                             | 477 | 417 | 142 | 98  | 98  | 119 |
| <b>BN 112</b>             | 28                             | 60      | M10 | 31       | 8       | 130                                | 110 | 160 | M8  | 3.5 | 219                             | 500 | 440 | 157 | 98  | 98  | 128 |
| <b>BN 132</b>             | 38                             | 80      | M12 | 41       | 10      | 165                                | 130 | 200 | M10 | 4   | 258                             | 638 | 558 | 193 | 118 | 118 | 180 |

N.B.:

Le dimensioni AD, AF, LL e V relative alla scatola morsettiera dei motori BN...BA dotati di alimentazione separata del freno (opzione SA) coincidono con quelle dei motori BN...FD di pari taglia.

NOTE:

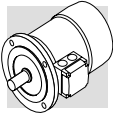
*Dimensions AD, AF, LL and V, relevant to terminal box of motors BN...BA featuring the separate brake supply (option SA), are coincident with corresponding dimensions of same-size BN...FD motors*

HINWEIS:

Die Abmessungen des Klemmenkastens der Motoren BN ... BA AD, AF, LL und V in bezug auf die separate Spannungsversorgung (Option SA) stimmen mit den Abmessungen der entsprechenden Motoren BN...FD überein.

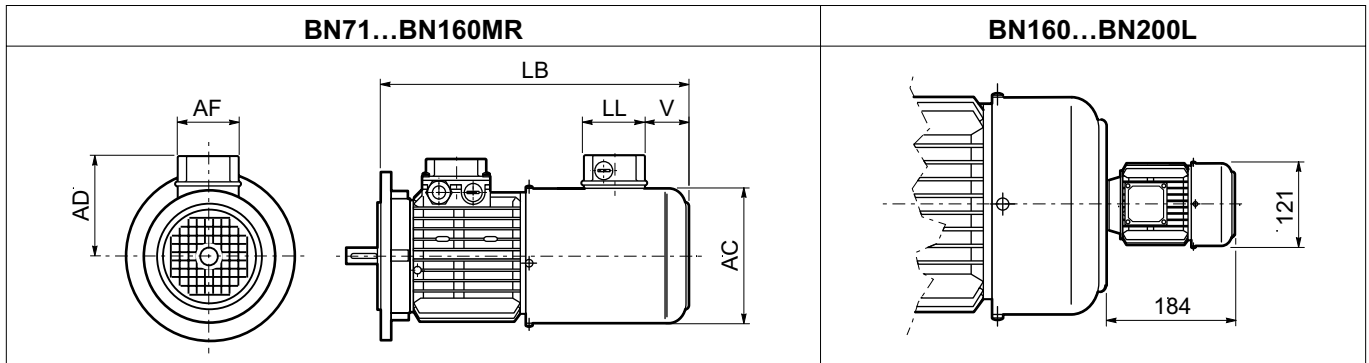
REMARQUE :

*Les dimensions AD, AF, LL et V relatives à la boîte à borne des moteurs BN...BA équipés d'alimentation séparée du frein (option SA) sont identiques à celles des moteurs BN...FD de la même taille.*



# U1

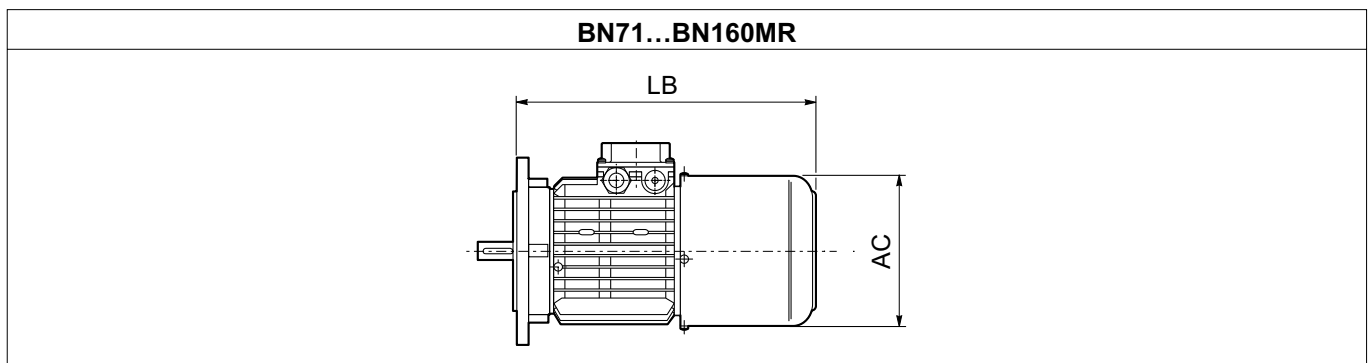
## BN, BN\_FD, BN\_FA



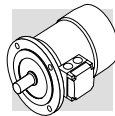
|                      | LB  | AC  | AD  | AF | LL | V  |
|----------------------|-----|-----|-----|----|----|----|
| <b>BN71</b>          | 312 | 138 | 112 | 70 | 70 | 36 |
| <b>BN80</b>          | 361 | 156 | 120 | 70 | 70 | 40 |
| <b>BN90S / BN90L</b> | 407 | 176 | 131 | 70 | 70 | 45 |
| <b>BN100</b>         | 426 | 195 | 145 | 90 | 90 | 40 |
| <b>BN112</b>         | 455 | 219 | 155 | 70 | 70 | 55 |
| <b>BN132</b>         | 574 | 258 | 174 | 70 | 70 | 87 |
| <b>BN160MR</b>       | 613 | 258 | 174 | 70 | 70 | 87 |

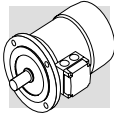
# U2

## BN, BN\_FD, BN\_FA



|                      | LB  | AC  |
|----------------------|-----|-----|
| <b>BN71</b>          | 312 | 138 |
| <b>BN80</b>          | 361 | 156 |
| <b>BN90S / BN90L</b> | 407 | 176 |
| <b>BN100</b>         | 426 | 195 |
| <b>BN112</b>         | 455 | 219 |
| <b>BN132</b>         | 574 | 258 |
| <b>BN160MR</b>       | 613 | 258 |





| R7                                                                                            |                                                                                                  |                                                                              |                                                                                                                                |
|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Descrizione                                                                                   | Description                                                                                      | Beschreibung                                                                 | Description                                                                                                                    |
| <div>342<br/>...<br/>343</div> Upgrade motori a eff2 M e BN a 2 e 4 poli                      | <i>Electric motor section adjourned with the rating of eff2 motors (BN and M 2 and 4 poles).</i> | Abschnitt der Elektor-Motoren um Bemessungsdaten für EFF2 Motoren erweitert. | <i>Les données techniques des moteurs électriques M et BN à 2 et 4 pôles ont été mises à jour avec la classification eff2.</i> |
| <div>353<br/>...<br/>360</div> Unificate dimensioni di ingombro per motori BN 132S e BN 132M. | <i>Unified dimension for motor BN 132S and BN 132M.</i>                                          | Vereinheitlichte Abmessungen für Motoren BN 132S und BN 132M.                | <i>Les dimensions des moteurs BN 132S et BN 132M sont à présent identiques.</i>                                                |

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